seitz
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roundshot
fast 360 degree panoramic equipment

Instruction Manual

Roundshot VR Drive – generation 2

Software release: *version 2.13 (December 2014)*

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1. System Overview

1.1 Roundshot VR Drive Hardware Options

The VR Drive is available in a variety of **hardware options**, each designed for a specific task:

VR Drive "full"	VR Drive "semi"	VR Drive "base"	VR Drive "turntable"
• VR Drive motor with touch screen • Li-Ion batteries (inside motor) • charging unit • VR bracket • quick adaptor • y-motor with clamp and connection cable • release cable for digital camera • spirit level • allen key to attach camera	• VR Drive motor with touch screen • Li-Ion batteries (inside motor) • Charging unit • VR bracket • quick-adaptor • y-clamp for manual tilting • release cable for digital camera • spirit level • allen key to attach camera	• VR Drive motor with touch screen • Li-Ion batteries (inside motor) • charging unit • quick-adaptor • base rail • release cable for digital camera • spirit level • allen key to attach camera	• VR Drive motor with touch screen • Li-Ion batteries (inside motor) • charging unit • turntable with screw attachment • release cable for digital camera with 2m extension cable • spirit level • allen key

The **VR Drive "full"** is equipped with a horizontal (X) and vertical (Y) motor and rotates fully automatically in all directions (X,Y).

The **VR Drive "semi"** is equipped with a horizontal motor (X) only. For this model the vertical tilting is done manually.

Designed for those applications requiring no vertical displacement - for example when capturing a sphere with a fisheye lens – **the VR Drive "base"** comes with the horizontal motor (X) and a base rail.

Finally, the **VR Drive "turntable"** consists of the VR Drive horizontal motor (X) and a turntable for object movies.

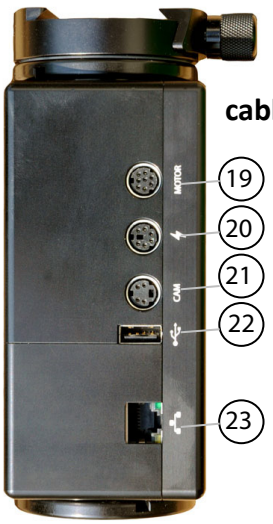
It is possible to purchase **additional accessories** to complete the VR kit, for example the turntable with 2m extension cable, additional release cables, additional rails. All hardware options are **upgradeable**. For example, it is possible to purchase the y-motor with connection cable to transform the VR Drive from "semi" to "full".

1.1 Roundshot VR Drive Hardware Options (continued)

Roundshot VR Drive “full”

VR Drive components

1. VR Drive x-motor
2. touch screen
3. on/off button
4. VR Drive y-motor
5. quick adaptor
6. quick adaptor release
7. VR bracket lock
8. VR bracket
9. nodal rail
10. nodal rail clamp
11. release cable
12. USB cable for camera control (optional)
13. motor cable x-y
14. spirit level
15. tripod mount (3/8’’)
16. y-motor front
17. y-motor rear
18. socket for radio control unit (receiver)+ for light meter

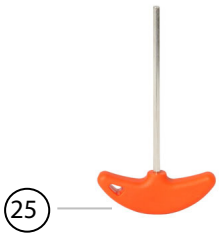


cables/plugs

19. x-motor
20. charging unit
21. release cable
22. USB
23. Ethernet

1.1 Roundshot VR Drive Hardware Options (continued)

Roundshot VR Drive “semi”



(24) y-clamp for manual tilting

(25) Allen key 4mm for
- attaching/removing camera to nodal rail
- attaching/removing y-motor to VR bracket
- locking/releasing VR Drive x-motor on tripod

(26) Allen key 3/16’’ for removing/attaching or fine-tuning y-motor clamp

1.2 Roundshot VR Drive Software Options

For cylindrical or spherical panoramas, single- or multi-row

Quality mode

The VR Drive **quality mode** is the base functionality for panoramas up to 360° (or more). The camera is stopped in every position. This mode is used for panoramas with difficult lighting conditions (indoors) and for bracketing and HDR images.

Speed mode

In the **speed mode** the camera is rotated non-stop, ideal for moving scenes outdoors. As a rule of thumb, the camera shutter speed requires to be 1/500 sec. or faster (for a 6 second 360° rotation).

For object movies

Turntable mode

In **turntable mode** the camera captures images of a rotating object on a turntable for object movies. Never miss an image, perfect positioning!

For timelapse movies

Timelapse mode

In **timelapse mode** the VR Drive releases a sequence of images which are then composed into a timelapse movie. Two capture formats are possible: 360° rotation or linear movement along a rail.

1.2 Roundshot VR Drive Software Options (continued)

For video sweeps

Video mode

The **"video mode"** is designed for smooth automated video sweeps, both position- and time-controlled, horizontally (x) and vertically (y).

For 32-bit HDR images

HDR mode

In the **"HDR mode"** the camera is controlled by the VR Drive, enabling wider bracketing for 32-bit HDRs.

Digital SLR cameras have a bracketing range limited to +/- 2 f-stops. For 32-bit HDR photography this is insufficient. The VR Drive "HDR mode" overcomes this limitation by **controlling the camera software directly and allowing a virtually unlimited bracketing range**. It is an "all-in-one" solution - no additional devices are needed.

32-bit HDR images are used for **3D modeling** (e.g. for realistic rendering of construction data into a 3D environment) and for **tone-mapping**, allowing more clarity and detail in bright and dark areas.

1.3 Roundshot VR Drive accessories

Short nodal rail (for fisheye lenses)

Long nodal rail – 220mm (for long + heavy lenses)

Clamp for manual tilting

Additional VR bracket

Radio release unit

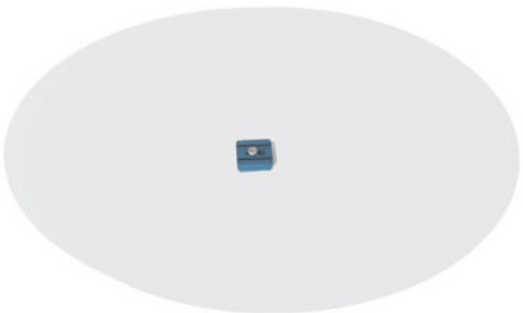
Additional spirit level

1.3 Roundshot VR Drive accessories (continued)

Additional camera release cables
(please check our website for list of compatible cameras)

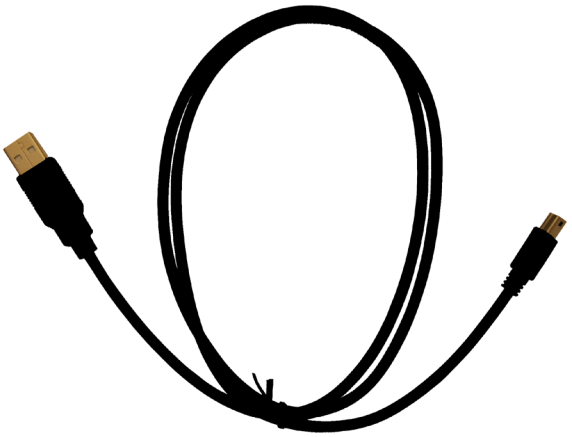
Additional motor cable x-y

Extension cable (2m) for turntable



Turntable

1.3 Roundshot VR Drive accessories (continued)



USB cable to connect VR Drive with camera (for HDR mode)

Additional universal charger (110-220V)

Light meter

Wi-Fi router

2. First Steps With Your VR Drive

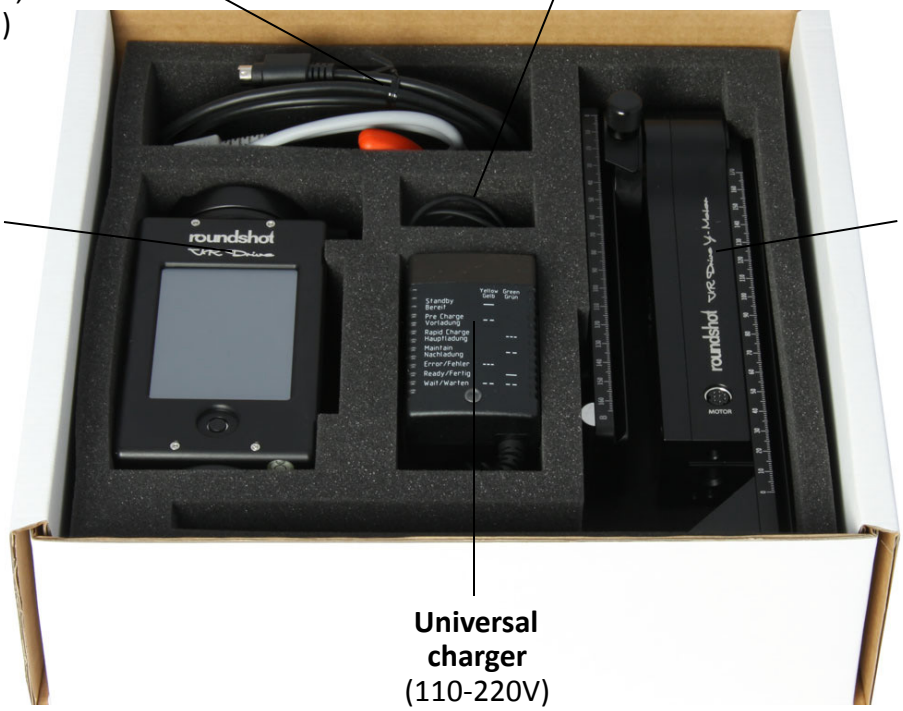
2.1 Setting up the VR Drive hardware

Your VR Drive is delivered in a **compact shipping box** with foam protection.

The shipping box consists of **five compartments**:

VR Drive accessories (connection cables, tools, spirit level)

VR Drive release cable



VR Drive motor

VR bracket with VR Drive y-motor (or nodal rail clamp) and nodal rail

Universal charger (110-220V)

2.1 Setting up the VR Drive hardware (continued)

2.1.1 Roundshot VR Drive “full”

Assemble your VR Drive “full” in the following way:

Place the VR Drive x-motor on a **tripod with a large (3/8’’) thread**. When using a tripod with small thread (1/4’’) use an adaptor ring inside the VR Drive motor base.

When the VR Drive locks up very tightly on the tripod, it can be **released** with the allen key

Slide the VR bracket with attached y-motor **into the quick adaptor and close the quick adaptor lock tightly.**

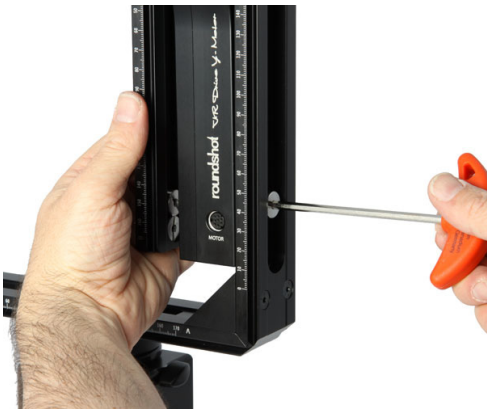
To avoid damage to the VR Drive gears we recommend that you attach the VR Drive gently by hand and then lock it using the allen key. The same is true when removing the VR Drive from the tripod.

Open the quick adaptor release and turn the VR bracket in position.

Close the quick adaptor release tightly.

Do not turn the VR bracket, when the quick adaptor is locked. Due to the high leverage the **VR Drive motor and the gears can be damaged**.

2.1.1 Roundshot VR Drive “full” (continued)



Adjust the height of the y-motor using the allen key.

Make sure that there is **enough space for large cameras and lenses** when tilting downward -90°.

It is possible to **slide the y-motor up** and fix it at the very top.

However, for **stability purposes it is better to keep the y-motor as low as possible.**

Now **connect the y-motor cable into the VR Drive x-motor**.

Connect the other end of the cable into the VR Drive y-motor (front or rear).

2.1.1 Roundshot VR Drive “full” (continued)

Attach your digital camera to the nodal rail using the allen key.

Make sure that the camera is always attached at the same position. We recommend sliding the camera to the very rear (zero position). When attaching the camera at different positions the nodal points in the software will no longer be correct.

If the nodal rail is not long enough (or longer lenses) use a separate, longer nodal rail (available on request).

Check that the **rear of the camera is mounted straight at exactly 90° with the nodal rail:**

wrong

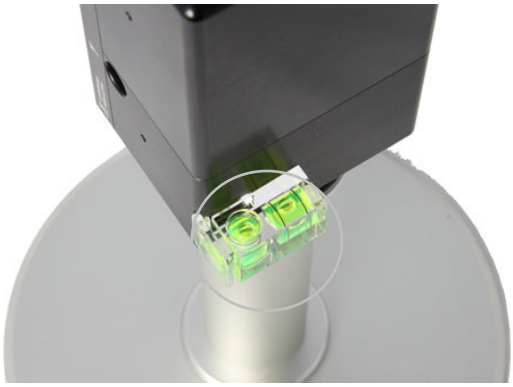
correct

2.1.1 Roundshot VR Drive “full” (continued)

Slide the camera with the nodal rail **into the nodal rail clamp.**

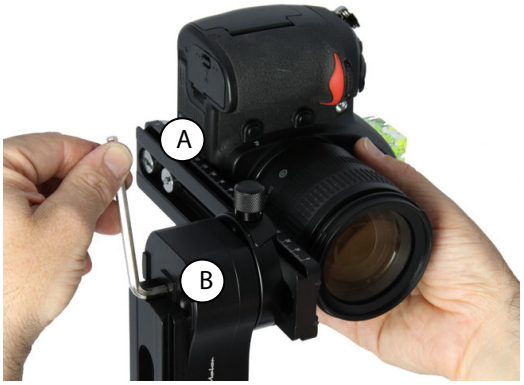
Close the nodal rail clamp lock.

Check if the VR Drive x-motor is level using the **spirit level** on the motor.



You can also attach the **spirit level** at the **side of the x-motor.**

Now **check that the camera is exactly level using the spirit level.**



It is possible to level the camera either **using the nodal rail screw (A)** or by **fine-tuning the nodal rail clamp (B).**

2.1.1 Roundshot VR Drive “full” (continued)

Connect the release cable into the VR Drive x-motor

Connect the other end of the release cable into the **camera** . Push it tightly into the socket.

Finally **connect the USB cable into the camera and into the VR Drive x-motor (optional)**

Your **VR Drive “full”** is now **ready.**

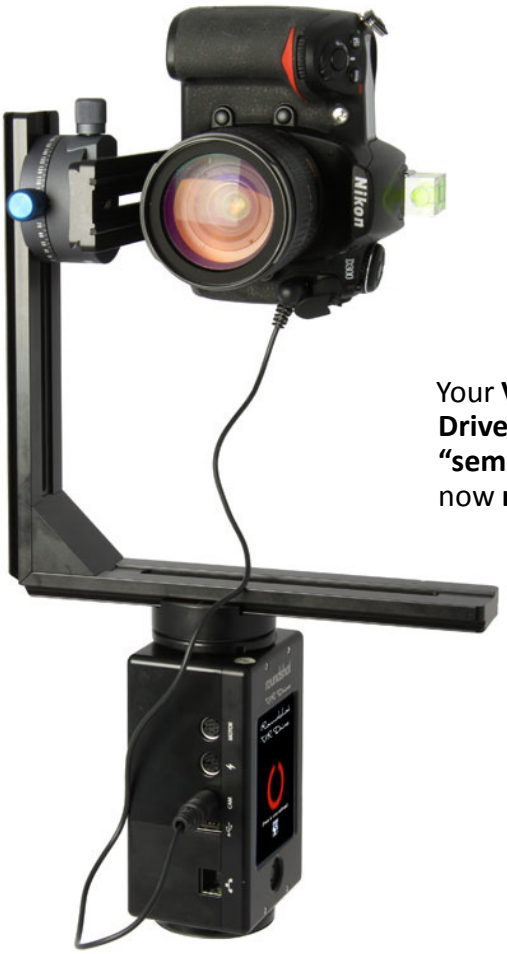
2.1.2 Roundshot VR Drive “semi”

The **VR Drive “semi”** is set up in the same way as the VR Drive “full” except that there is just a **nodal rail clamp** instead of the y-motor and that **only the camera release cable needs to be connected.**

The **height** of the nodal rail clamp can be adjusted with the allen key.

Connect the release cable into the VR Drive **x-motor** and into the **camera** . Push it tightly into the socket.

Finally **connect the USB cable into the camera and into the VR Drive x-motor (optional)**



Your **VR Drive “semi”** is now **ready.**

2.1.3 Roundshot VR Drive “turntable”

Assemble your VR Drive “turntable” in the following way:

Lock the quick adaptor release and **remove the quick adaptor from the VR Drive x-motor** by turning it anti-clockwise. Hold the turntable with the allen key without turning the allen key.

Attach the VR Drive x-motor upside-down on the tripod.

Attach the 3/8’’ thread.

Attach the quick adaptor.

2.1.3 Roundshot VR Drive “turntable” (continued)

The turntable is covered with a protective foil on both sides.

Remove the protective foil on both sides of the turntable before use.

Slide the **turntable** into the **quick adaptor** and lock it firmly.

Connect the **release cable** into the **VR Drive x-motor** and into the camera . Push it tightly into the socket.

Use the **2m extension cable** to increase the distance between camera and turntable. It is possible to use several 2m extension cables.

Your **VR Drive “turntable”** is now **ready.**

2.1.4 Roundshot VR Drive “linear rail”

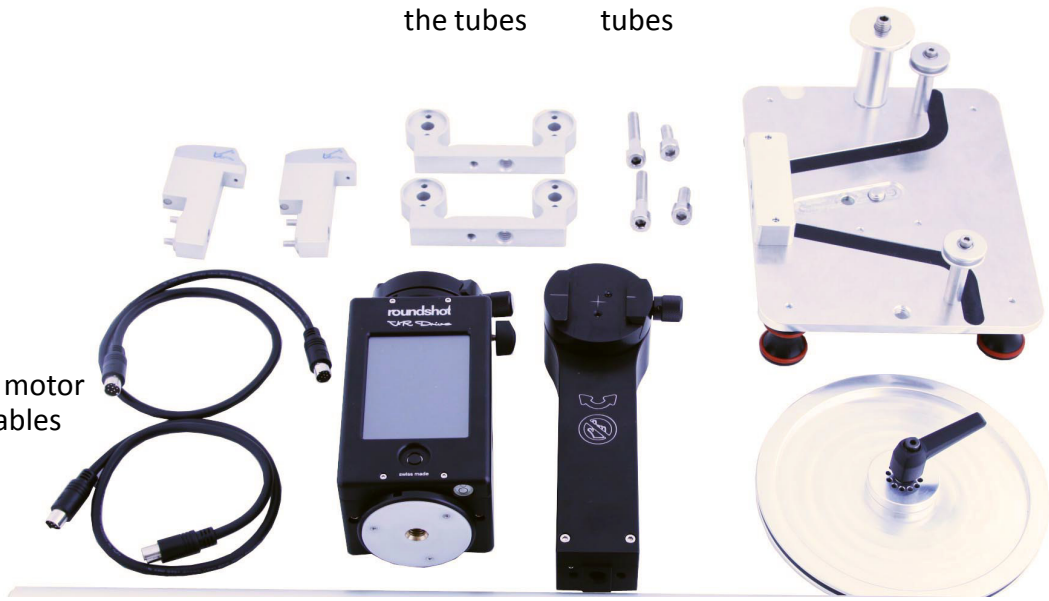
These are the necessary parts to build up a linear rail with 1 tube element length

2 edge sensors

2 edge elements to hold the tubes

2 long and 2 short screws to attach the tubes

1 linear rail slider unit



2 motor cables

1 wheel with manual lock lever

1 VR Drive x-motor

1 VR Drive y-motor

2 tubes of equal length

1 rope

2.1.4 Roundshot VR Drive “linear rail” (continued)

Assemble your VR Drive “linear rail” in the following way:

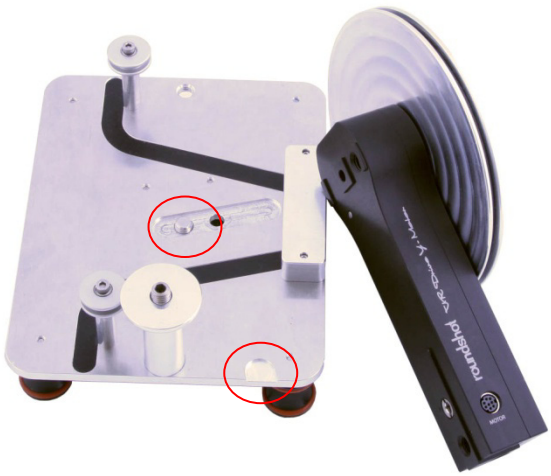
Step 1: build the linear rail main unit

Remove the Q-mount of the Y-motor using the Allen key

Attach the linear rail wheel on the Y-motor using the Allen key. Once firmly attached, use the screw driver to tighten the 3 security screws as shown on the right image .

2.1.4 Roundshot VR Drive “linear rail” (continued)

Attach the Y-motor to the linear rail slider unit. The Y motor fits into the positions on the slider unit marked in red. Once the Y-Motor is correctly positioned, use the Allen key to firmly close the main screw in the unit centre.

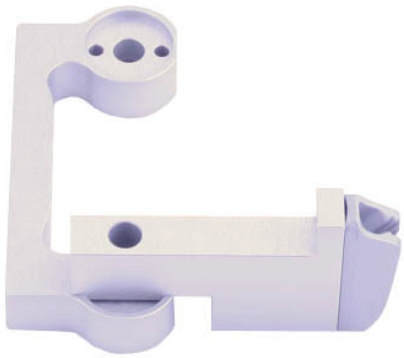


The linear rail slider unit is now ready.

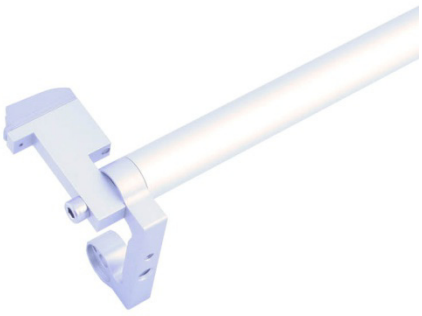
2.1.4 Roundshot VR Drive “linear rail” (continued)

Step 2: Assemble the linear rail tube structure

Start with assembling one of the edge sensors with an edge element. The 2 pins on the edge sensor should fit in a dedicated location. Please note that there is no specific side at this stage

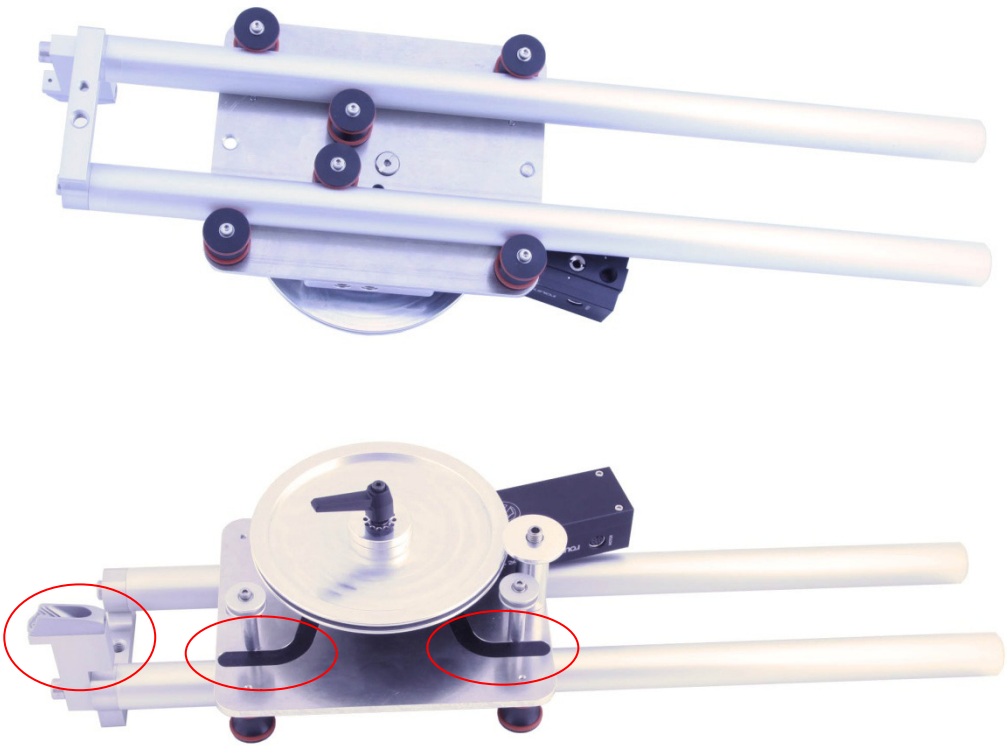


Use the long screw on the sensor side to attach the first tube and the small screw on the other side to attach the second tube. Then use the Allen key to firmly close the 2 screws



2.1.4 Roundshot VR Drive “linear rail” (continued)

Slide the 2 tubes in the Linear rail main unit as shown below. Make sure the black lines of the main unit are on the same side as the edge sensor.



Close the linear rail structure by attaching the remaining edge element and edge sensor on the other side of the tubes. Please make sure the sensor is on the same side as the first sensor.

2.1.4 Roundshot VR Drive “linear rail” (continued)

Optional: Extend the linear rail with extension tubes (this step should be done before closing the linear rail structure with the edge sensor)

These are the necessary parts to extend the linear rail:

1 centre element to hold the tubes
(same as edge element)

2 screws (without head)

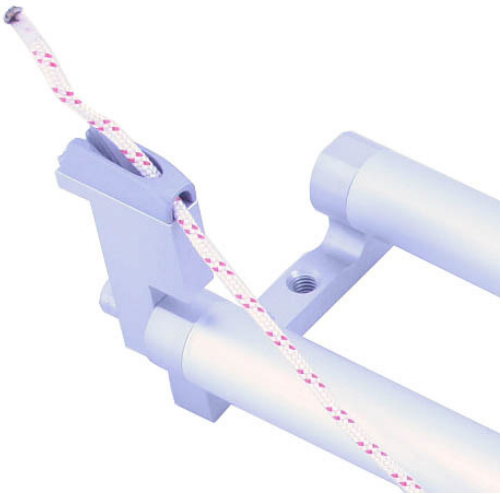
2 equally sized tubes

Start by placing the centre elements at the edge of the existing structure, and fix the 2 screws by turning them into the tubes as far as possible. Then attach the 2 additional tubes to the screws by turning into the screws, until they are firmly attached.

Repeat this procedure until all extension tubes are assembled. Then close the structure with an edge sensor as explain in the previous page.

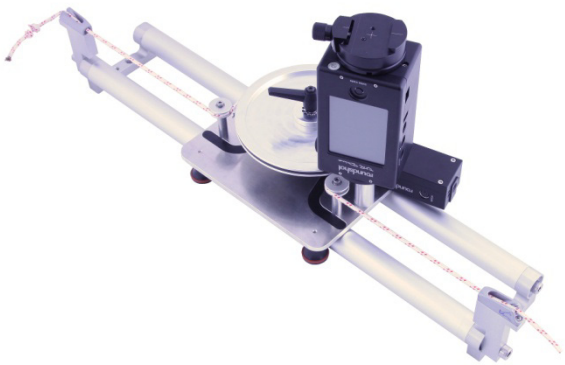
2.1.4 Roundshot VR Drive “linear rail” (continued)

Place the rope following the dedicated path as described below. Pull the rope firmly and attach it to the break on top of the sensor elements. Make security knots at the 2 rope edges. Make sure to close the wheel lock lever manually to fix the main unit on the rope.



Step 3: Assemble the VR Drive x-motor

Attach the VR Drive X-Motor on the dedicated place of the linear rail slider unit. Make sure the roundshot logo is up-side-down. In this set-up only the turntable will rotate instead of the entire x-motor, thus preventing the motor cables from being damaged. Attach the 2 motor cables on the available sockets on the linear rail slider unit. One cable connects to the Y-motor and the other to the X-motor (motor socket).



Your linear rail is now ready to use and can be attached on 2 or more tripods depending the number of extension tubes. Please make sure to use enough tripods or other support element to avoid the linear rail to bend under the camera and main unit weight.

2.1.5 Roundshot VR Drive “dolly”

Assemble your VR Drive “dolly” in the following way:

Step 1: build the dolly frame without motors

These are the necessary parts to build up the dolly frame:

2 short screws for the corner elements

2 wheels (diameter = 200mm)

2 corner elements (left + right)

1 double junction element

1 round distance element

2 long screws for the wheels with washers

3 equally sized tubes

Start with attaching 2 tubes with the double junction elements. You can just turn the tubes until they are firmly attached.

2.1.5 Roundshot VR Drive “dolly” (continued)

On each tube attach one of the 2 corner elements using the short screws. Make sure to place the straight sides of the corner element to face each other, as shown in the picture below.

At this stage do not tighten the short screws completely, this will simplify the next steps.

Use the 2 long screws and the 2 washers to prepare the wheel attachments as follow. The washers will be inside and the screw head outside the dolly.

Place the 3rd tube between the 2 corner elements to form a triangle. As the corner elements are not yet firmly attached they can be adjusted to fit with the tube.

Fix the left part of the tube using the left wheel as prepared before. The screws (long and short) can be attached firmly on this side of the dolly.

2.1.5 Roundshot VR Drive “dolly” (continued)

Attach the right wheel on the right corner element the same way as for the left part. Make sure that all the screws are now firmly attached.

The Dolly frame is now ready and looks as follow (view from the top):

Step 2: attach the VR Drive x- and y-motor to the dolly frame

Option 1: Both the x- and y-motor are used to drive the dolly. The camera position is fixed on the dolly.

These are the necessary parts to build up Option 1:

Wheel arm

VR Drive x-motor

VR Drive y-motor with already attached wheel

2.1.5 Roundshot VR Drive “dolly” (continued)

Attach the wheel arm on the VR Drive x-motor on one side (left image) and to the y-motor on the other (right image).

Attach the round distance element on top of the VR Drive x-motor. Using an Allen key, attach the Dolly frame to the round distance element as shown below.

Finally connect the VR Drive x-motor and the y-motor with the motor cable (in the same way as for the regular VR Drive) and place a camera with or without tripod on top of the dolly.

2.1.5 Roundshot VR Drive “dolly” (continued)

Option 2 : y-motor is used to drive the dolly. The VR Drive x-motor is used to position the camera on top of the dolly.

These are the necessary parts to build up option 2:

VR Drive x-motor

VR Drive y-motor with already attached wheel

Wheel arm

Fix the flat arm on the y-motor using the Allen key as shown below. Then attach the round distance element on top of the y-motor. Using an allen key, attach the dolly frame to the round distance element as shown below.

2.1.5 Roundshot VR Drive “dolly” (continued)

Place the VR Drive x-motor (with an optional tripod) on top of the dolly. Then connect the x- with the y-motor using the motor and extension cables as well as the release or USB cable (for image release in timelapse mode).

Finally place a camera on top of the VR Drive main unit. You can see an example of the final configuration below:

Mounting the release or USB cable between camera and the VR Drive is not always necessary:

- In video mode the cable is not required (no image release, only filming)
- In timelapse mode it is required as the VR Drive releases the camera at defined positions

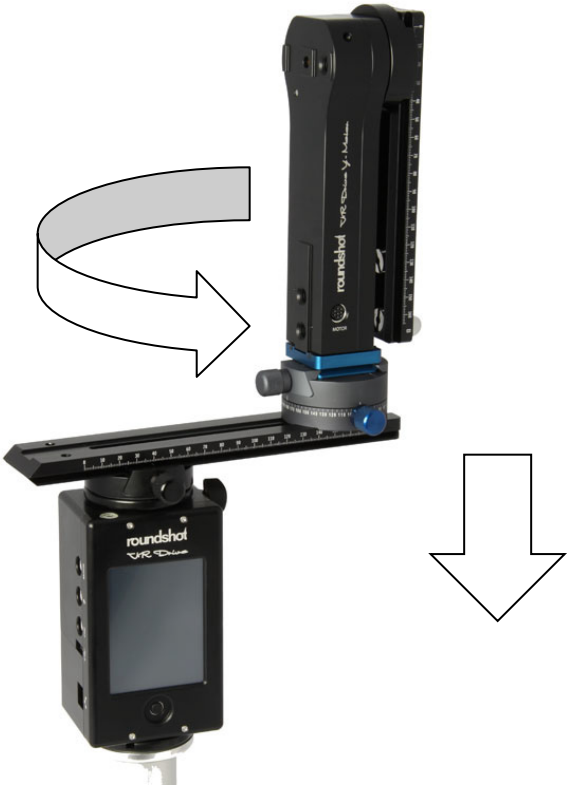
2.1.6 Special hardware assembly options

There is a variety of **special assembly options** for particular tasks:

Attach camera adaptor into quick adaptor for **mounting camera directly on VR Drive x-motor.**

Slide nodal rail into quick adaptor for **mounting camera directly on VR Drive x-motor with nodal point adjustment.**

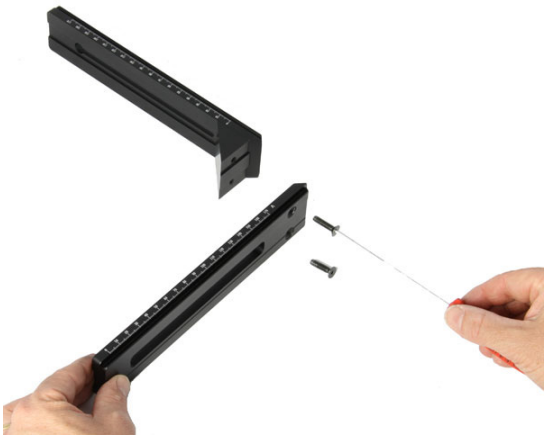
Fix VR Drive y-motor at a 90° angle on the VR bracket to make the unit very compact **for gigapixel photography (cylindrical), especially with large cameras and heavy lenses**



Fix VR Drive y-motor directly on lower bracket with q-mount to turn camera away from centre of VR Drive **for -90° image (spherical panorama)**

2.1.6 Special hardware assembly options (continued)

Fix VR Drive y-motor directly on lower bracket for compact cameras (greater stability).

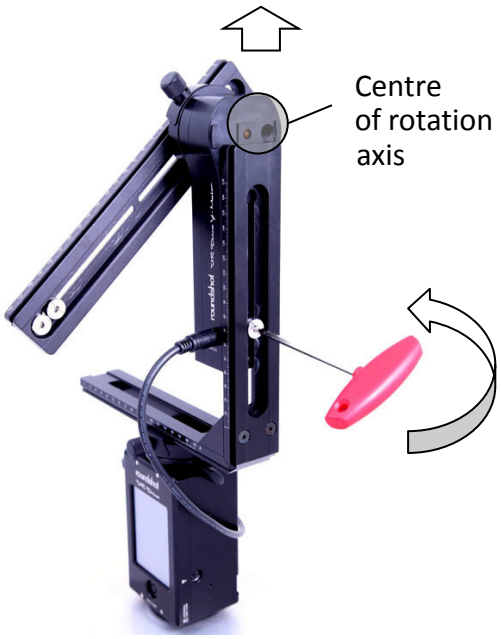


The **VR bracket can be disassembled** by loosening the two screws below.

It is then possible to **attach the VR Drive y-motor directly on the lower VR bracket** using the two screws.

2.1.6 Special hardware assembly options (continued)

When the VR Drive y-motor stops at a **wrong parking position**, it can be mechanically adjusted back into the correct parking position like this (example: **parking position Y=90°, camera looking up**):



Step 1: Turn off the VR Drive so it moves into the parking position

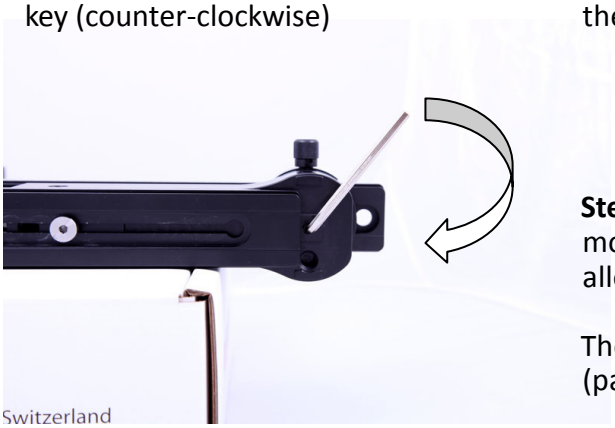
Step 2: Use the allen key to open the screw holding the y-motor in the L-bracket

Step 3: Shift the y-motor up so that the centre of the y-motor rotation axis is accessible

Step 4: Detach the VR bracket from the VR Drive by opening the quick adaptor

Step 5: Place the VR bracket with y-motor flat on an elevated surface with the centre of the y-motor rotation axis freely suspended

Step 6: Now open the screw inside the y-motor rotation axis with the small allen key (counter-clockwise)



Step 7: Move the nodal rail down so that it is flat on the surface and parallel with the y-motor

Step 8: Tighten the screw inside the y-motor rotation axis again with the small allen key (clockwise)

The nodal rail is now again in the correct (parallel) position.

2.1.7 Light meter

The **light meter sensor** consists of the following parts:

Socket for upper screw

Socket for lower screw

Allen key with screws

Light meter sensor

Never place the light meter sensor on the connector pins as they are fragile.

Attach the **light meter** in the following way:

Insert the **light meter pins** into the **plug** marked with the antenna symbol: Y

Insert the **lower screw** and attach it with the allen key.

Insert the **upper screw** and attach it with the allen key.

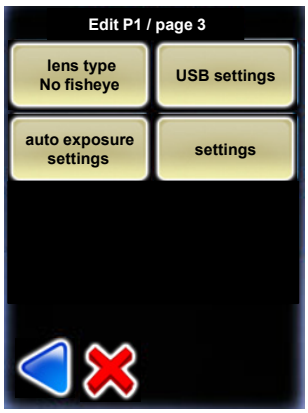
2.1.7 Light meter sensor (continued)

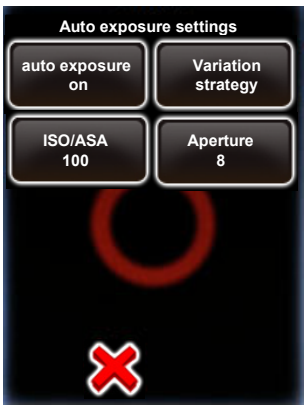
Once the light meter sensor is attached, it will be automatically detected by the VR Drive.

If the camera used is compatible with the VR Drive USB control, The program wizard will directly suggest automatic light metering options.

To manually activate automatic exposure functions

- Open the **Edit menu**
- Open the menu **auto exposure settings**
- Set the **auto exposure** parameter to **on**
- Set the other automatic exposure parameters (Strategy, ISO/ASA, aperture). More details are available in the section **Tips and tricks -> Using automatic light meter**





Click on **“auto exposure”** to activate the automatic exposure functionality with light meter sensor.

Please note that the light meter **can only** be used **in combination with cameras compatible with the VR Drive USB control**. These cameras are marked in bold in the VR Drive camera compatibility section on our website.

2.1.8 Radio control unit

The **radio control unit** consists of the following parts:

Allen key with screws

Radio receiver (on VR Drive)

Radio sender (remote)

With the VR Drive delivery the radio control unit is **already attached** on the VR Drive. It does not have to be removed.

When separated from VR Drive **never place the radio receiver on the connector pins** as they are fragile.

2.1.8 Radio control unit (continued)

Attach the **radio receiver** in the following way:

Insert the **radio receiver pins** into the **plug** marked with the antenna symbol: Y

Insert the **lower screw** and attach it with the allen key.

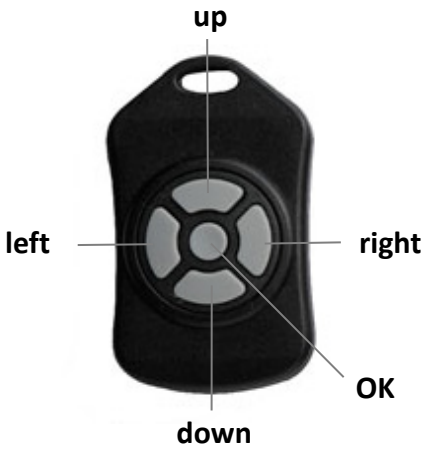
Insert the **upper screw** and attach it with the allen key.

Now press a **sharp item (for example a pen) into the sync contact** in the middle of the radio receiver.

Then press the **"OK"** button of the **radio sender.** This will synchronise the radio signal between sender and receiver.

2.1.8 Radio control unit (continued)

Once the synchronisation process is complete, the red blinking LED turns off.
The radio sender and receiver are now set up for operation.



Position the VR Drive in the X and Y dimension using the **left/right/up/down buttons**.

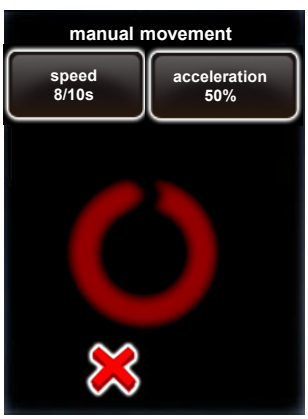
"OK" will start the currently active VR Drive program.

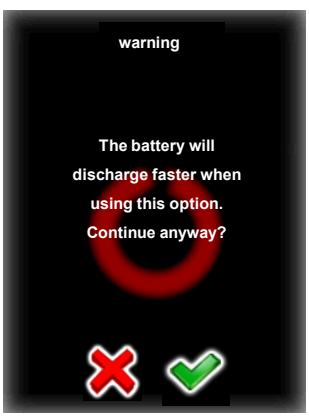
The VR Drive will start a new program from the actual **x-position** set with the control unit.

The red LED will turn on when a positioning command is received. The radio control unit allows to bridge a distance of about **30 metres** (100 feet).

Pressing a button continuously will accelerate the positioning speed.

The **VR Drive software** allows to set certain parameters for the radio control unit in the **settings/general** menu:





In the **manual movement menu** the user can set the **speed of rotation** and the **acceleration** preferences when using the radio control unit.

With **wake on radio** set to "yes", the VR Drive can be turned on remotely with the radio control unit. The remote positioning (left/right/up/down) is possible in both wake on radio options (no or yes).

Please consult the **settings menu** for further information on these two functions.

2.1.9 Wi-Fi router for remote control

The **Wi-Fi router** consists of the following parts:

Connect the Wi-Fi router with the VR Drive using a short Ethernet cable.

Switch on the Wi-Fi rooter by setting the slider to **R position**

Finally attach the Wi-Fi On the back of the VR Drive

2.1.9 Wi-Fi router for remote control

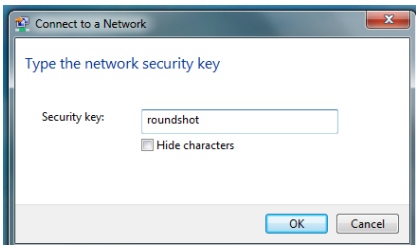
As a first step assign the following fixed IP to the VR Drive in edit/settings/software/IP:

192.168.169.15

Once the Wi-Fi router is connected to the VR Drive, you can use any computer or mobile phone for remote control.

This second step is to connect to the **VR Drive** Wireless network and type the password. By default the password is

roundshot



Then you can open any Web browser and type in the URL : **http://192.168.169.15.** You can see now the same screen content as on the VR Drive main unit and all functionalities are identical.

Summary of default IPs:

Router:	192.168.169.2
VR Drive:	192.168.169.15
Browser:	192.168.169.15

The default IPs can be changed, for example to adapt them to a different network. To do this, access the router software by opening a browser window with the IP 192.168.169.2 and change the IP range in the router. Adapt the IPs in the VR Drive and in the Browser window.

This VR Drive wifi screen transmission **works only with software versions 2.12 or higher.** For older software versions please upgrade the software first.

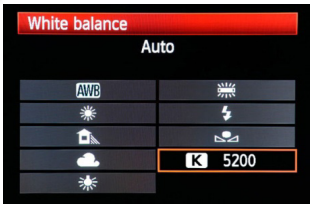
2.2 Setting up the digital camera

Please make sure that your camera settings correspond to the following:

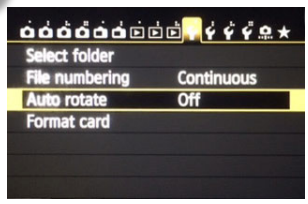
Always use **manual exposure**. With automatic exposure the images will be differently exposed and the VR Drive can no longer set up the exposure values for automatic exposure.

Always use **manual focusing**.

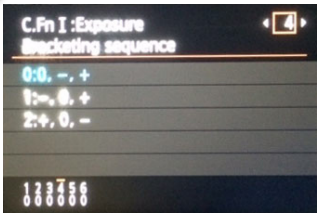
Use a **fast storage card** with enough capacity.



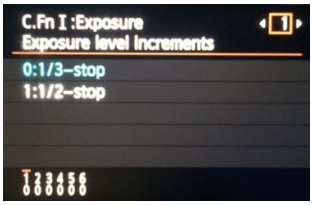
Set the **white balance to a fixed value.** When setting the white balance to "auto", every image will have a different tone, making the stitching problematic.



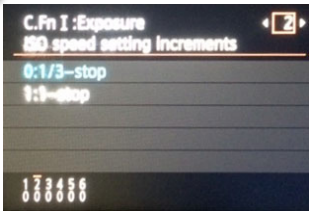
Turn the **"Auto rotate"** feature to **"off".** When automatically rotating the images the stitching will not perform correctly.



Turn off any exposure bracketing sequence. The VR Drive Metric creates its own bracketing sequence by controlling the camera exposures, f-stop and ISO.



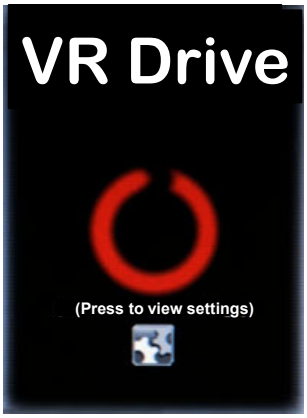
Set the **exposure increments to 1/3 steps**. When selecting 1/2 steps the VR Drive can no longer set up the correct exposures for HDR bracketing or for automatic exposure.



Set the **ISO speed setting increments to 1/3 steps**. When selecting 1/1 steps the VR Drive Metric can no longer set up the correct exposures for HDR bracketing or for automatic exposure.

2.3 Setting up the VR Drive software

Press the VR Drive **“on/off”** button to start the VR Drive:



When delivered the VR Drive is already set-up with your language, time settings and camera favourites.

These steps are normally only necessary after a factory reset.

As a first step, select your **language**. The options are:

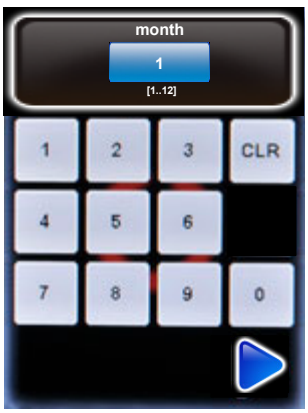
- English
- German
- French
- Italian
- Spanish
- Portuguese
- Russian
- Chinese
- Japanese

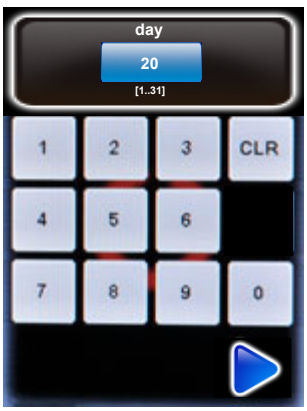
Confirm with the **“next”** button.

Now set the **year, month, day and time** by using the number keypad.

When several entry fields are available, the active one is highlighted in light blue, the inactive one in darker blue. Click on an entry field to activate it.

Confirm the entries with the **“next”** button.





2.3 Setting up the VR Drive software (continued)

Load the **cameras** that you will be using with the VR Drive from the data base , selecting the camera brand/type from the list.

These cameras will be loaded into your personal favourites list which is required to program the VR Drive.

Click on the button to add more cameras from the database.

Additional cameras can be added later in the “settings” menu. If your camera is not in the list, it can be added manually to the database.

When your selection is complete, confirm with the **“next”** button.

The set-up wizard is now complete.

A first default program in “quality” mode is displayed which uses the camera data of the first camera in the favourites list and some default values: **“P1”**.

“P1” can later be edited, copied, moved or deleted. It is created only for setting up the VR Drive at this stage.

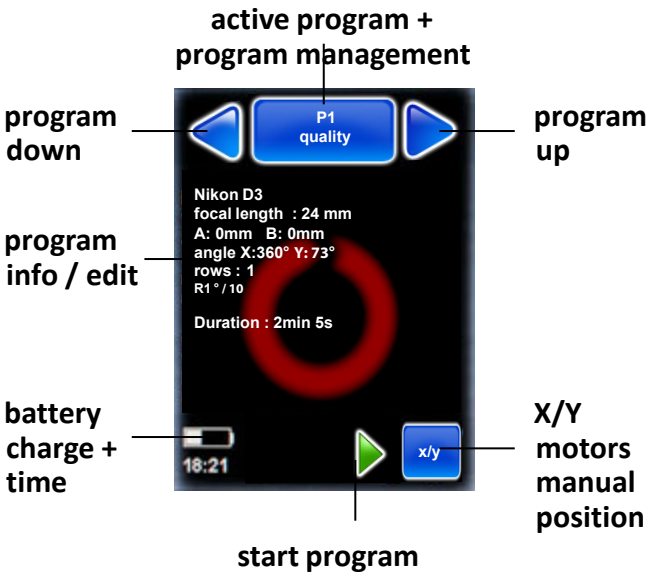
The camera type (i.e. the sensor size) is required for automatic calculation of rows/images in the “quality”, “speed” and “HDR” modes. For the “turntable” and “video” modes the camera type is used for information only and has no computation purpose.

If the HDR mode of the VR Drive is active, an HDR compatible camera needs to be selected in the favourite list. If it is not the case the VR Drive will ask you to select one during the set-up process.

2.4 Navigation

The VR Drive starts up with the **“home menu”:**

VR Drive idle



VR Drive running

The “home menu” shows the currently **active program**. Clicking on this button will load the **program management** menu.

The arrow buttons **“program down”** + **“program up”** allow easy navigation between existing programs.

In the centre of the screen the main **program info** parameters are displayed. Clicking in this section will load the **program edit** menu.

The **“start”** button enables to launch the active program.

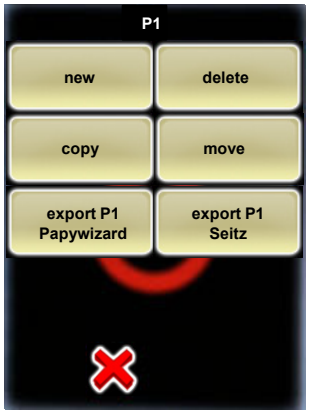
When the program sequence is ongoing, this icon will switch to a red **“stop”** button.

The **“pause”** button will momentarily interrupt the process; further options are possible (stop, resume)

With the **x/y** button allows to reposition the starting point of the VR Drive or to freely position and release the VR Drive manually.

The **battery charge** and the **current time** are displayed with their respective icons.

2.4 Navigation (continued)

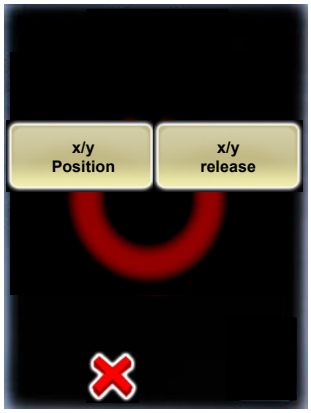


Clicking the **"active program + program management"** button opens the "program management" menu.

In this menu new programs can be created with the **"Program Wizard"**, existing programs can be deleted, copied or moved into a different position. The program can also be exported on USB key.

More details about this menu are given in section "Program management".

Return to the "home menu" by clicking **"X"** (cancel).

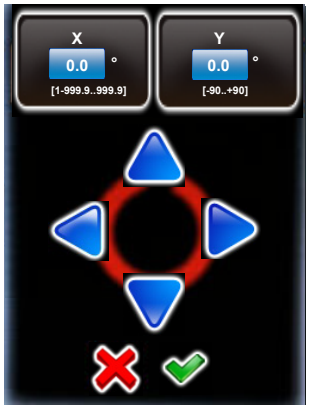


Click on the **"x/y"** button to manually control the position of the VR Drive x and y motors.

Select **"x/y position"** to define the VR Drive 0 point.

Select **"x/y release"** to freely position the VR Drive and release the camera

Move back up to the "home menu" with the **"cancel"** button.

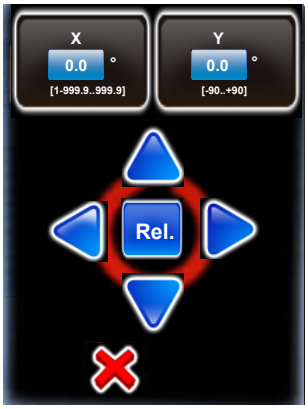


"x/y position" sets the starting or "zero" position for the VR Drive.

"X" sets the angle in horizontal, "Y" the angle in vertical direction.

For example, for image sequences which always start with the sky (zenith) shot, it is possible to define the starting position as X= 0° and Y=90°.

2.4 Navigation (continued)

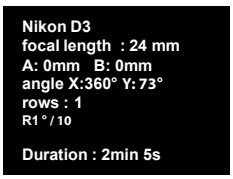


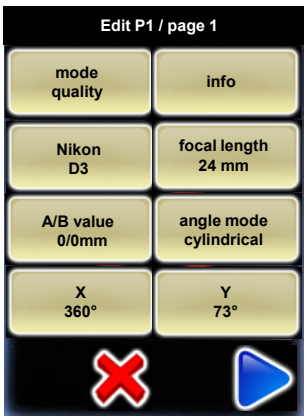
“x/y release” allows to freely position the camera using the VR Drive and manually release it.

Use the arrows to move the X and Y motors.

Press on the **“rel”** button to release the camera

Return to the “home menu” by clicking **“X”** (cancel).





Clicking the **“program info”** section opens the **“program edit”** menu.

In this menu all program parameters can be changed.

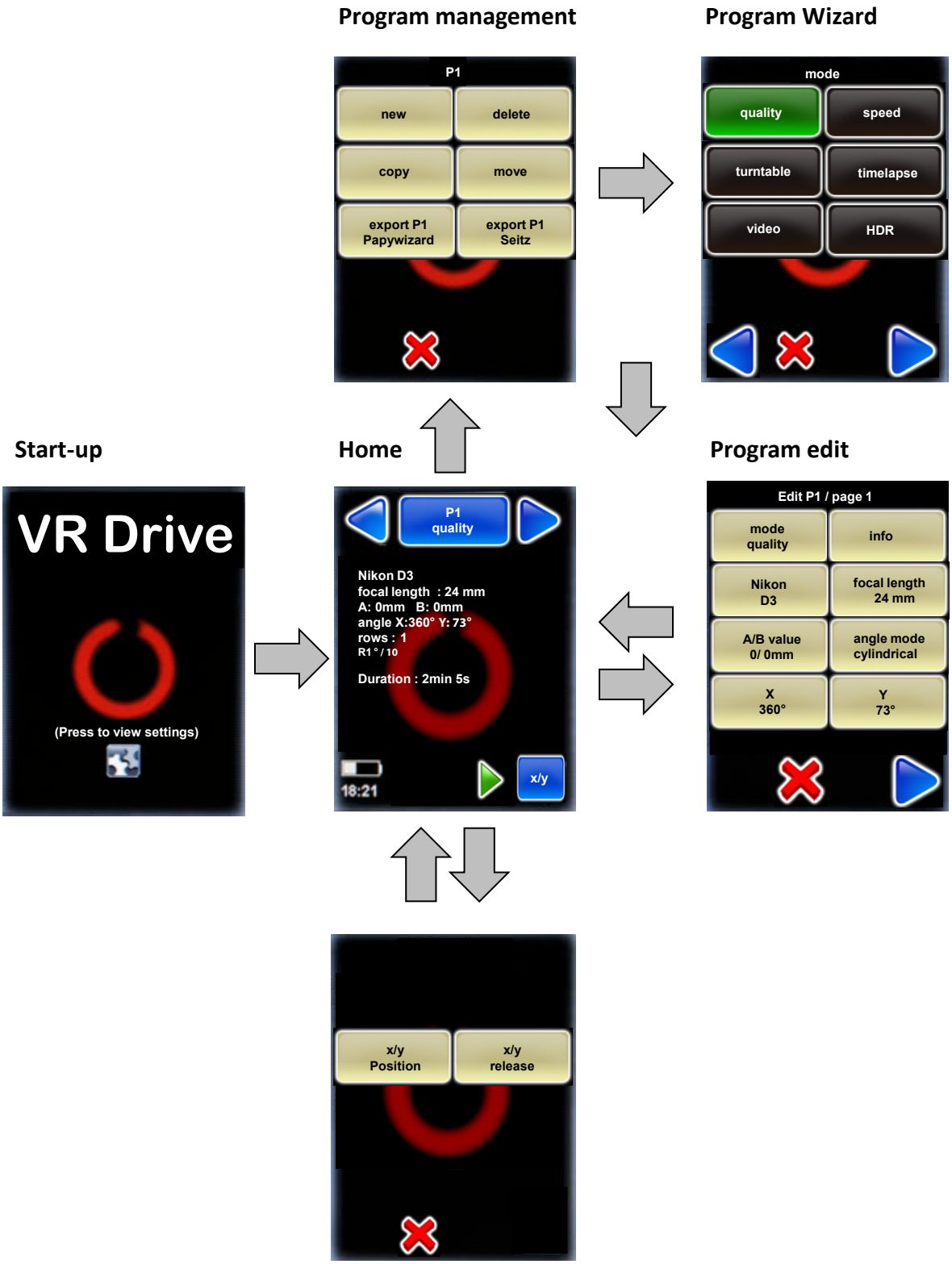
This menu also allows to access the VR Drive settings menu.

For more information about the “program edit” menu please refer to chapter 4.

Return to the “home menu” by clicking **“X”** (cancel).

2.4 Navigation (continued)

The following is an overview of the VR Drive navigation:

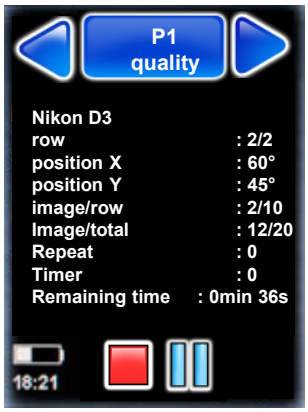


VR Drive starting position and manual release

2.5 Starting/stopping the VR Drive

In the “Home” menu click on “start” to launch your first VR Drive image sequence:

The VR Drive will start executing the active program – in this example “P1” in “quality mode”.
In this example it will rotate 360° horizontally to take 10 images spaced at exactly 36°.
The VR Drive stops and releases the camera in every position.

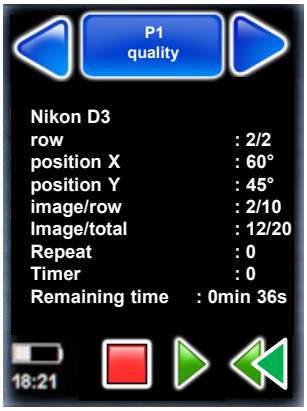


While the VR Drive is running, the touch screen display shows the **progress of image takin**g:

- Row
- position X
- position Y
- Current image / images in row
- Current image / total number of images
- Number of times the program was repeated
- Timer
- Remaining time

Stop the program any time by pressing the **“stop”** button.
The VR Drive will return to its initial position and the software displays the “home” menu with the currently active program.

Pause the program any time by pressing the **“pause”** button.
The VR Drive will pause at its current position.

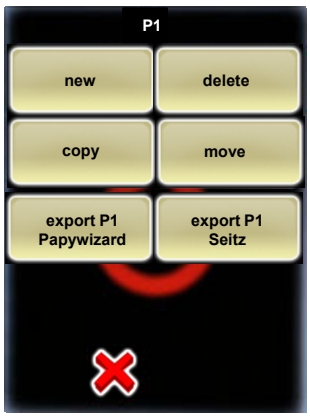


Once the program is **paused,** it is possible to

- Completely stop the image sequence by pressing **“stop”**
- Resuming the image sequence by pressing **“start”**
- Returning to any image and by pressing **“back”** and resuming by pressing **“play”**

3. Program Management

3.1 Overview



Click the **"program management"** button.

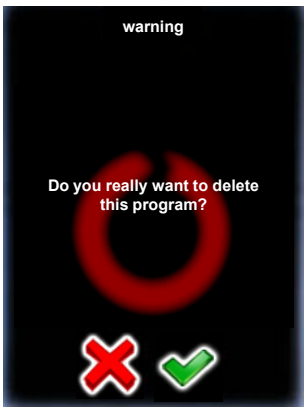
Besides creating **new programs** with the **Program Wizard** the program management menu allows to:

- **Delete** a program
- **Copy** a program
- **Move** the ID number of program and the sequence of programs
- **Export** a program in Papywizard format. Used in stitching programs
- **Export** a program in Seitz format. Used to back-up program or load it in other units

Clicking the **"new"** button will launch the **Program Wizard** to set up new VR Drive programs using various modes. The program wizard helps to set-up program parameters in a logical sequence, based on the VR Drive mode of operation.

See next section for more details about the workflow for each mode.

When clicking the **"delete"** button the currently active program will be deleted. This is the program from which the "program management" menu has been launched, in this example P1. All subsequent programs (P2, P3, …) will move up and will get new program numbers assigned (P1, P2, …).



Before deleting the program the program asks for confirmation.

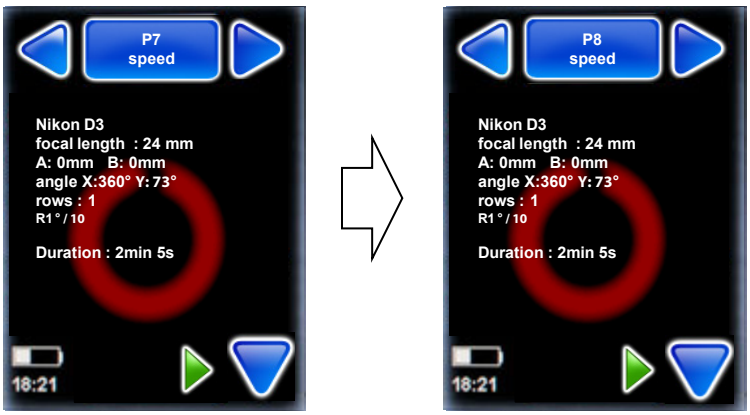
Cancel with **"X"**.

Confirm with **"OK"**.

3.1 Overview (continued)

copy

The **“copy”** command duplicates the currently active program.



This function is helpful when a new program needs to be created that is very similar to an existing one. After copying the program, simply edit the relevant parameters in the “program edit” menu.

move

The **“move”** command changes the sequence of programs by moving the currently active program to a new position.

For example, when **“P8”** is selected and when clicking on “move”, the program will ask for the new program ID:

After entering the new program number – in this example **“7”** – all subsequent programs will have a number increased by one, so the previous “P7” will now become “P8”.

export P1 Papywizard

Export a program in Papywizard format. The file will be written on the connected USB stick provided with the VR Drive. You can use this file with stitching software to define image positions.

export P1 Seitz

Export a program in Seitz format. The file will be written on the connected USB stick provided with the VR Drive. You can use this file as a program back-up and load it later in any VR Drive unit.

3.2 Program Wizard

When creating a new program, the VR Drive will launch the **Program Wizard.** The program wizard helps to set-up program parameters in a logical sequence, based on the VR Drive software mode.

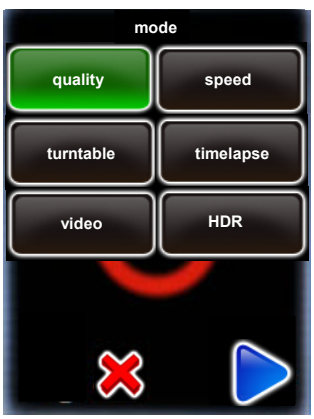
Launch the Program Wizard by clicking on **“new”.**

The Program Wizard will guide you step by step to set up a new VR Drive program.

Give the new program an **ID number**.

By default the new program will get the next available number after the last program.

Confirm with **“next”.**



As a first step select the VR Drive **mode** which you would like to use for the program.

All active modes are displayed in the list.

The **navigation** for the following steps in the Wizard is:
- **“next”** for confirming the choice and moving to the next step, or for displaying more choices
- **“confirm”** for confirming the choice and moving to the next step
- **“back”** for undoing the choice and returning to the previous step
- **“X”** for cancelling the program and exiting the Program Wizard

3.2 Program Wizard (continued)

3.2.1 Wizard workflow for quality, speed and HDR modes

“Quality”, **“speed”** and **“HDR”** modes, are used to capture panoramic images. The camera is placed on the nodal rail and the VR Drive releases the camera at predefined position.

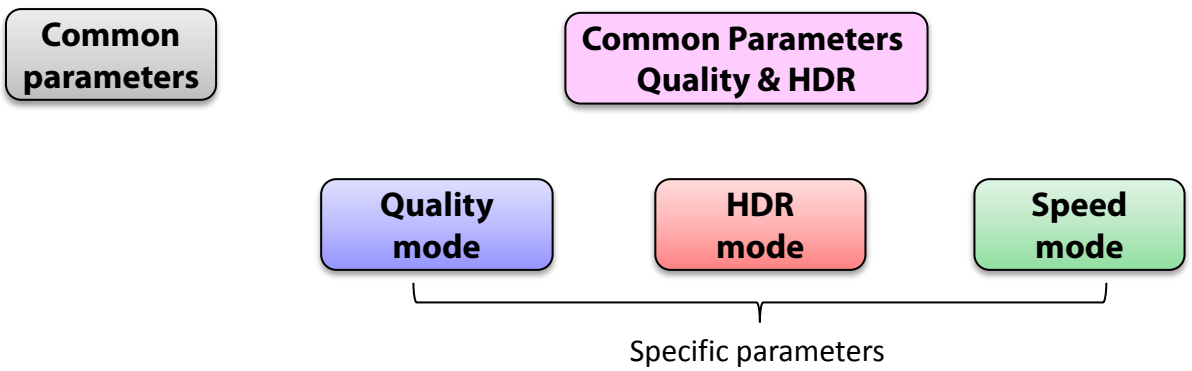
The main differences between these 3 modes are as follow:

• **“quality”** is the basic mode of the VR Drive. In this mode the VR Drive stops and releases the camera in every position.

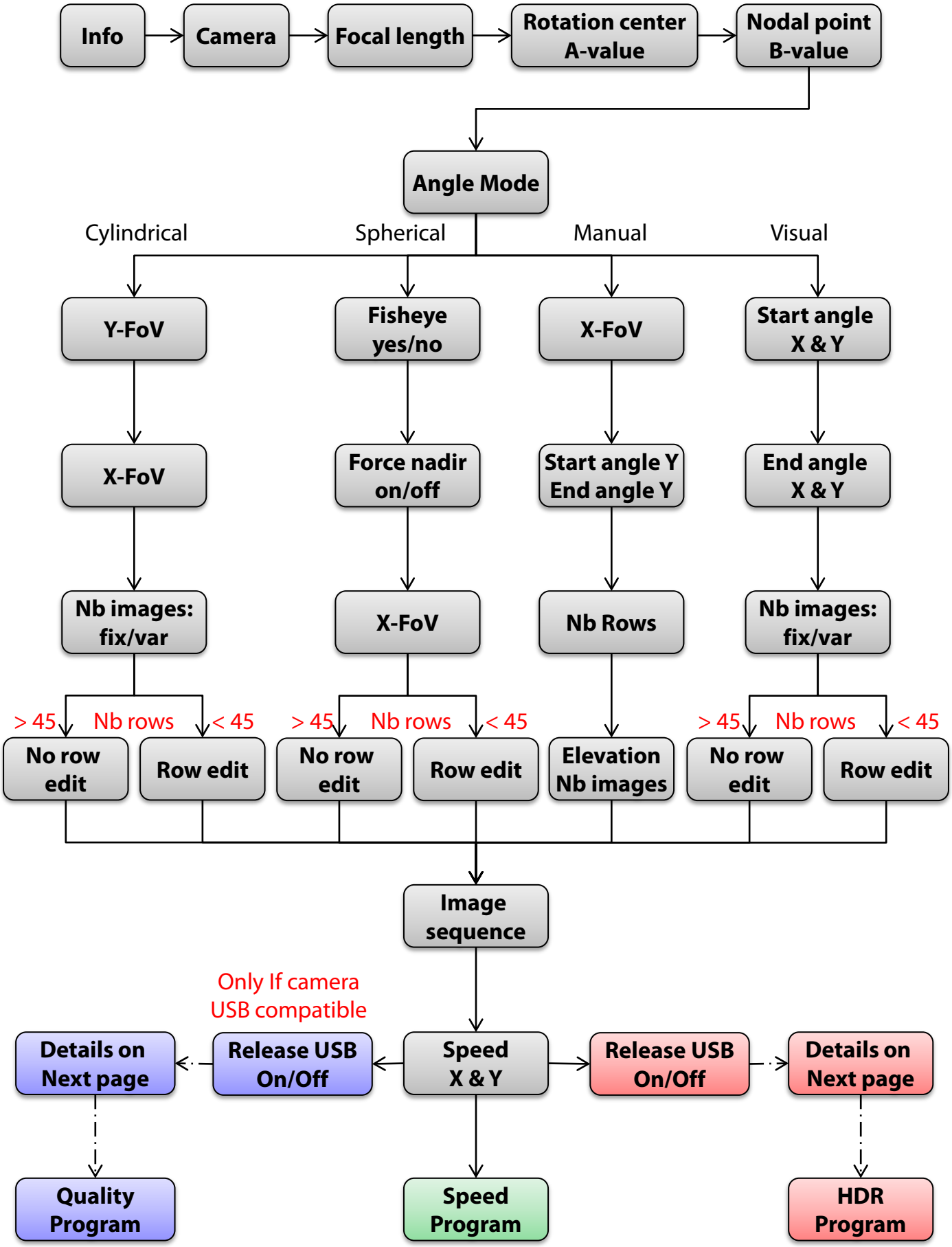
• **“speed” mode** is an optional mode used for fast image capture. In this mode the VR Drive releases the camera “on the fly” without stopping in every position. No pause after or before image taking is possible. This image capture mode is only possible in good light conditions when using fast exposure times on the camera

• **“HDR”** is an optional mode used for capturing high dynamic range panoramas. Compare to the quality mode, it contains very advanced bracketing menu and allows the VR Drive to control the exposure time the aperture and the ISO of the camera through USB cable.

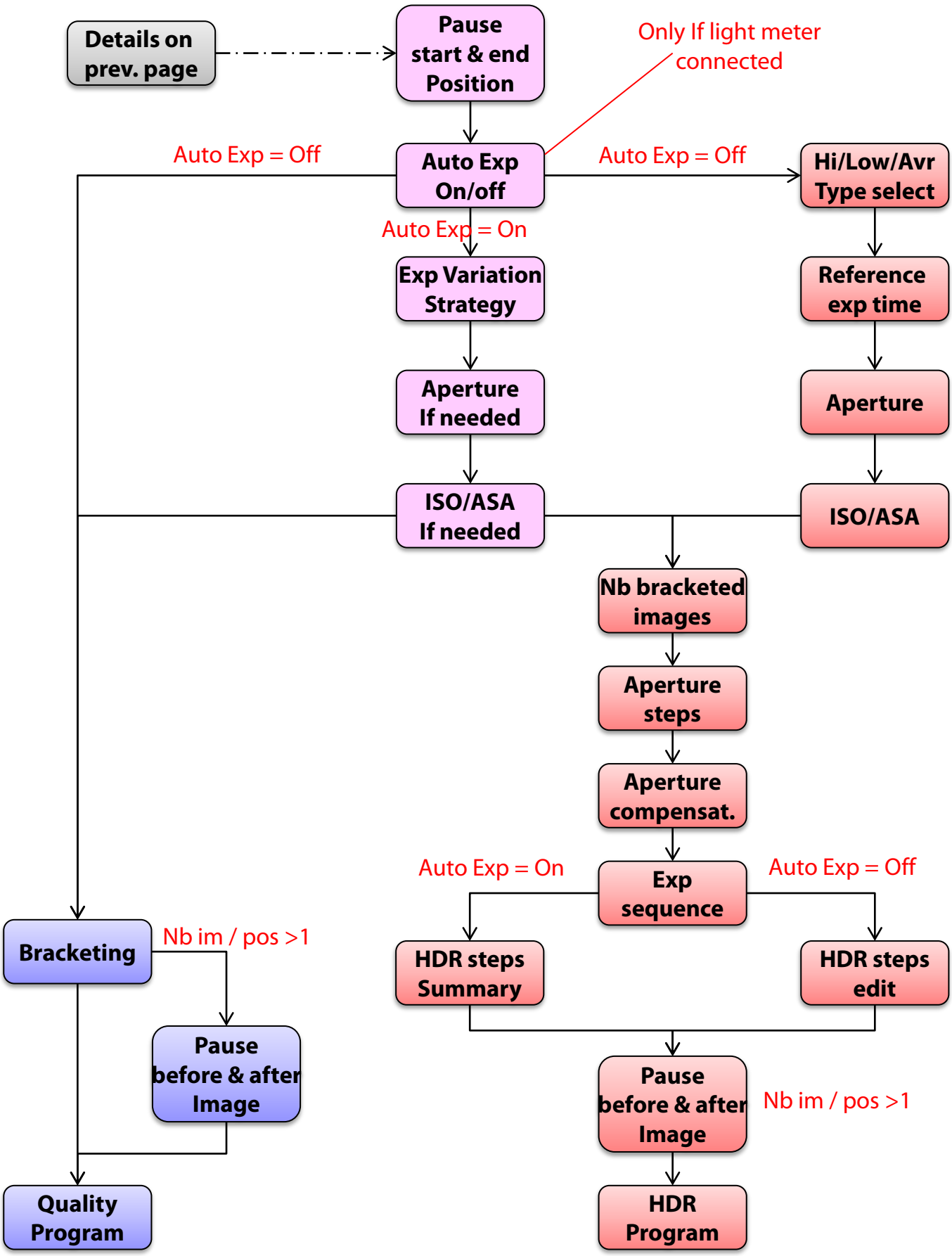
This section presents the parameter workflow generated by the wizard when selecting “quality”, “speed” or “HDR” modes. These modes were grouped in 1 diagram as they have many common parameters. Specific parameters for every mode are shown in the following colours:



3.2.1 Wizard workflow for quality, speed and HDR modes (continued)



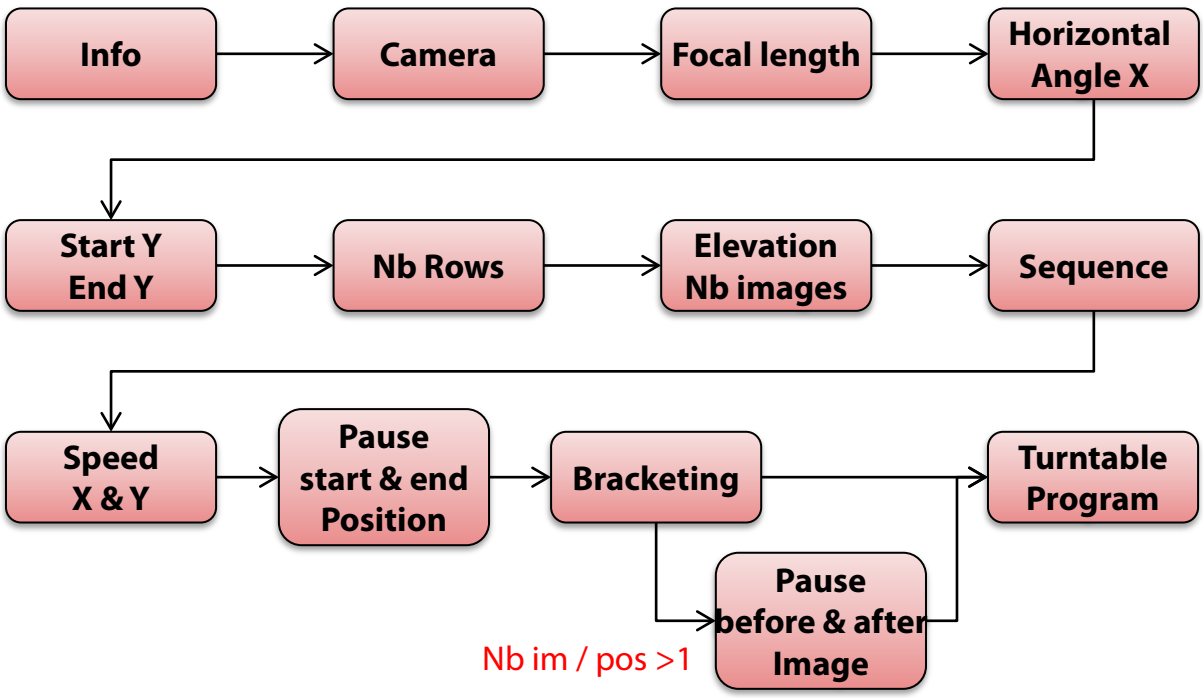
3.2.1 Wizard workflow for quality, speed and HDR modes (continued)



3.2.2 Wizard workflow for turntable mode

In **“turntable”** mode the camera captures images of a rotating object on a turntable for object movies. the hardware configuration is totally different from any other mode and therefore the program creation workflow is totally specific.

This section presents the parameter workflow generated by the wizard when selecting **“turntable” mode**.



3.2.3 Wizard workflow for “timelapse” and “video” modes

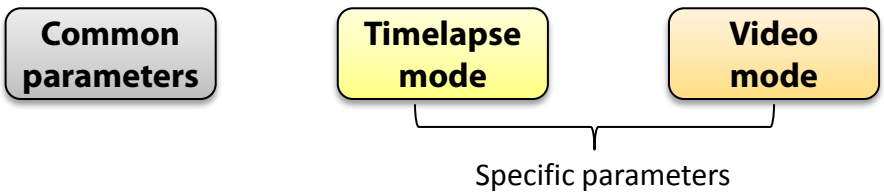
“Video” and **“timelapse”** modes, are used to move the camera smoothly through a custom path generating an animated movie.

The main differences between these 2 modes are as follow:

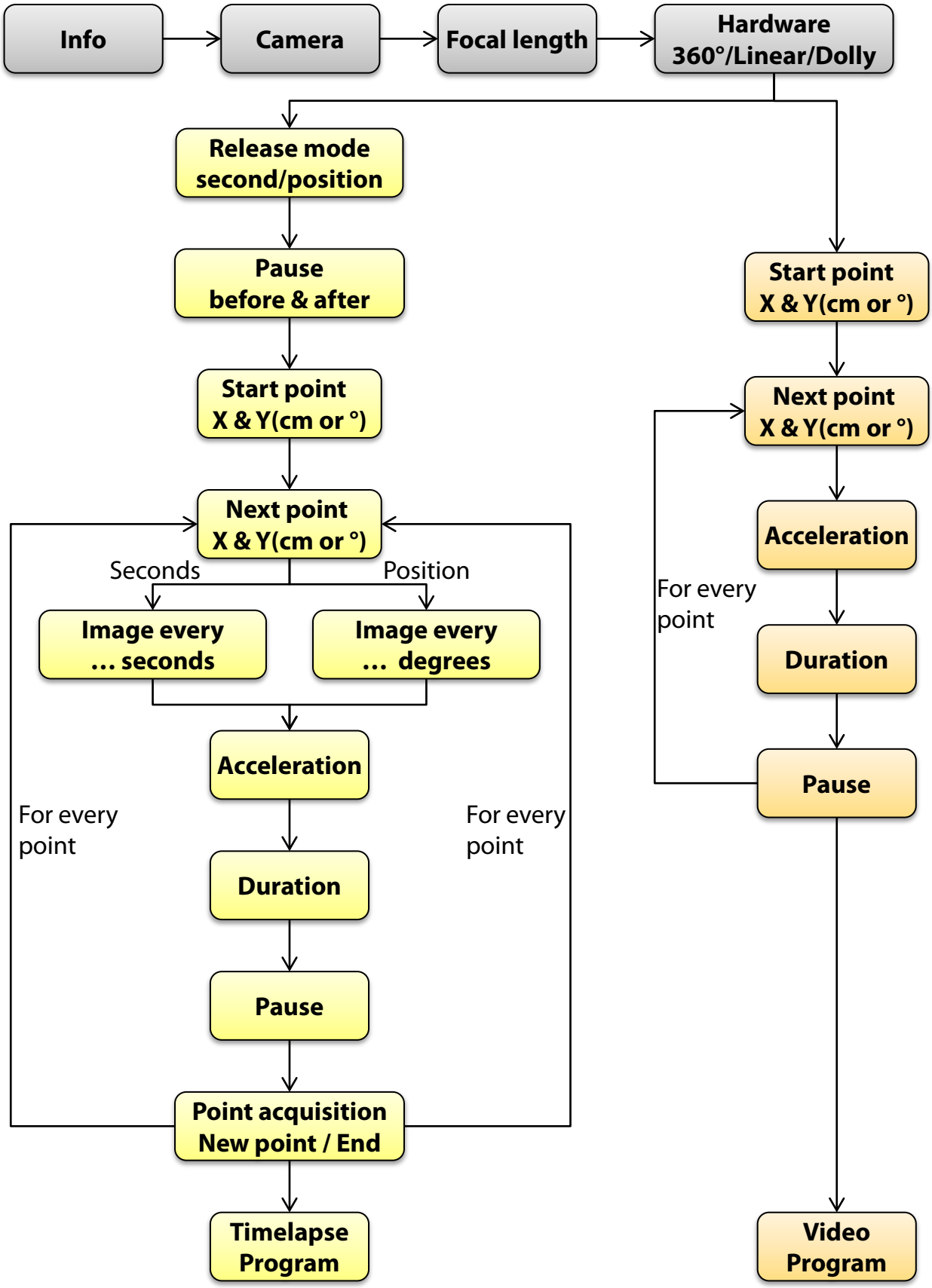
• In **“timelapse”** mode the VR Drive is used to release the camera and take pictures every ... seconds or degrees. The images will later be compiled together and accelerated to get a timelapse movie.

• In **“Video”** mode the VR Drive is used as a pure motorised arm. No image is captures and the camera needs to be set to capture a video.

This section presents the parameter workflow generated by the wizard when selecting “timelapse” or “video” modes. These mode were grouped in 1 diagram as they have many common parameters. Specific parameters for each mode are shown in the following colours:



3.2.3 Wizard workflow for timelapse and video modes (continued)



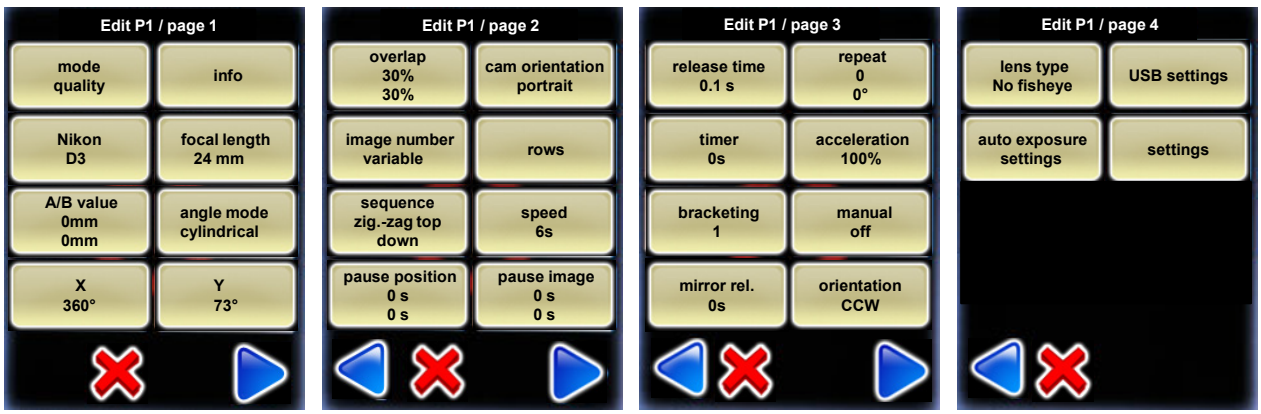
4. Program Editing

Once a new program is created using the **Wizard**, it is accessible from the program list in the **home menu**.

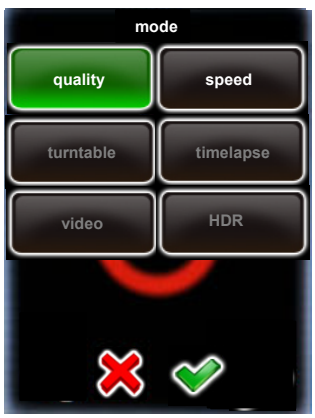
By accessing the **“program edit” menu** it is possible to edit any of the program parameters individually.

In this section you can find a detailed description of every editable program parameter as well as all the VR Drives predefined settings.

Click on the **“program info”** section to open the **“program edit”** menu.



4.1 Editing in quality, speed and turntable modes



Click on **“mode”** to change the VR Drive mode.

It is possible to **switch from “Quality” to “Speed” mode** and vice-versa.

Changing to “Speed” mode does not change the calculation of rows (elevation and images) or any other program parameters.

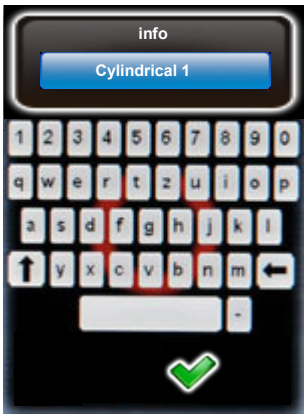
The only difference is that the following parameters will no longer be accessible in “speed” mode and will therefore be deactivated:

- Manual image release
- Bracketing
- Pause before / after image taking
- Acceleration
- Mirror prerelease

The “Turntable” mode is an entirely different application. The number of images are not calculated and therefore this mode has different variables. The same is true for the “Video”, “timelapse” and “HDR” mode.

This is why it is not possible to switch to “Turntable”, “timelapse”, “Video”, or “HDR” mode from “Quality” mode.

4.1 Editing in quality, speed and turntable modes (continued)

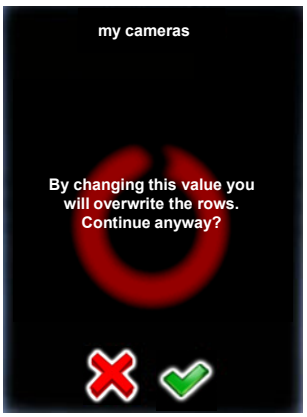


Click on **"text"** to change the label of the program.

Enter an alphanumeric/numeric text using the electronic keyboard.

It may be helpful to use a pen or other sharp item when using the keyboard.

Confirm with **"OK"**.



Click on **"camera"** to change camera brand/type.

As the sensor size is different from camera to camera, changing the camera will lead to an automatic recalculation of rows (elevation/images) for the program.

In angle mode "cylindrical" and "spherical" the existing rows will be overwritten. In angle mode "manual" the change of camera has no consequences. Here the rows must be edited manually.

Continue with **"OK"** or cancel with **"X"**.

Select the **camera** that you would like to use for the new program from your favourites list.

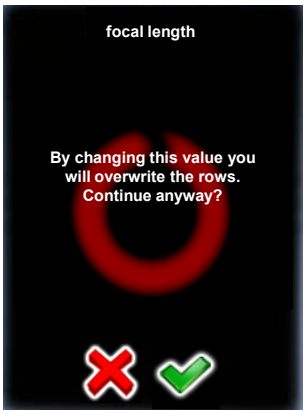
If the desired camera is not in the list, click on to access the full camera database. Select the camera to be added in the favourite list.

Confirm the choice of camera with **"OK"**.

The rows (elevation, number of images) will now be automatically recalculated.

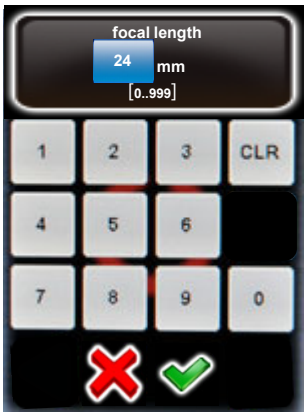
4.1 Editing in quality, speed and turntable modes (continued)

Click on **“focal length”** to change the focal length of the lens used for the program.



Changing the focal length will lead to an automatic recalculation of rows (elevation/images) in angle modes “cylindrical”, “spherical” or “visual”. In angle mode “manual” the change of camera has no consequences. Here the rows must be edited manually.

Continue with **“OK”** or cancel with **“X”**.



Enter the **focal length** of the camera lens.

This value must correspond with the exact setting on the lens. It is used – together with the camera sensor size and the vertical field of view – to automatically calculate the number of rows and images.

Confirm with **“OK”** or cancel with **“X”**.

In angle mode “cylindrical” and “spherical” the existing rows will be overwritten. In angle mode “manual” the change of camera has no consequences. Here the rows must be edited manually.

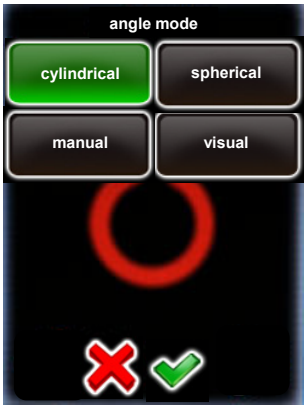
Click on **“A/B value”** to change the rotation and nodal point values for the program.

Please make sure that these values are correct. When setting the camera at wrong rotation or nodal points the stitching of images will not work.

Confirm with **“OK”** or cancel with **“X”**.

4.1 Editing in quality, speed and turntable modes (continued)

Click on **“angle mode”** to change the way the rows (elevation, number of images) are calculated.



The options are:
- cylindrical
- spherical
- Manual
- Visual

Changing the angle mode will lead to an automatic recalculation of rows (elevation/images) for the program.

Choose the new “angle mode” by clicking on the button.

The following angle mode modifications are possible:
- from cylindrical to spherical (computes a sphere)
- from spherical to cylindrical (computes one row with vertical FOV of chosen lens)
- from cylindrical to manual (requires manual programming of rows)
- from spherical to manual (requires manual programming of rows)

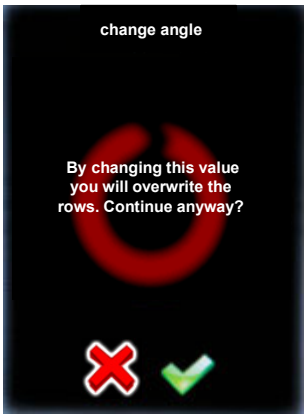
The transition from manual or visual to cylindrical or spherical is not possible.

Continue with **“OK”** or cancel with **“X”**.

In angle mode “cylindrical” and “spherical” the existing rows will be overwritten. In angle mode “manual” the change of camera has no consequences. Here the rows must be edited manually.

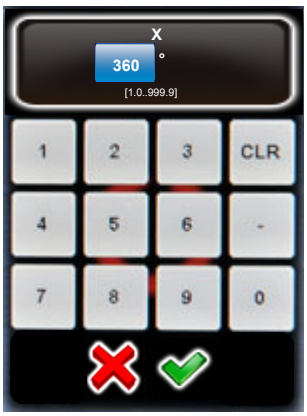
4.1 Editing in quality, speed and turntable modes (continued)

Click on **“X”** or **“Y”** to change the horizontal or vertical angle for the program.



Changing the angle will lead to an automatic recalculation of rows (elevation/images) or number of images per row for the program.

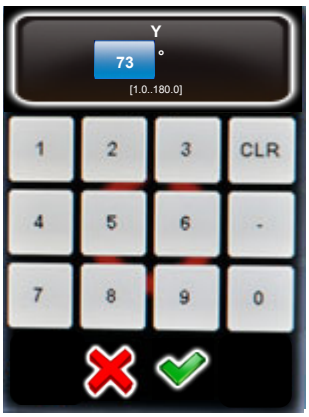
Continue with **“OK”** or cancel with **“X”**.



Enter the **“X”** angle (horizontal angle).

Confirm with **“OK”** or cancel with **“X”**.

The number of images per row will now be automatically recalculated.



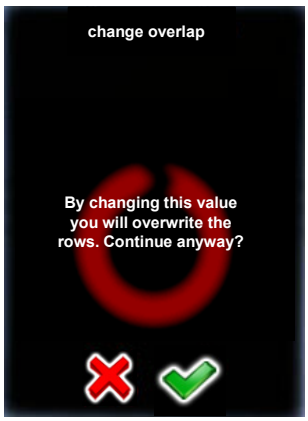
Enter the **“Y”** angle (vertical angle).

Confirm with **“OK”** or cancel with **“X”**.

The rows (elevation, number of images) will now be automatically recalculated.

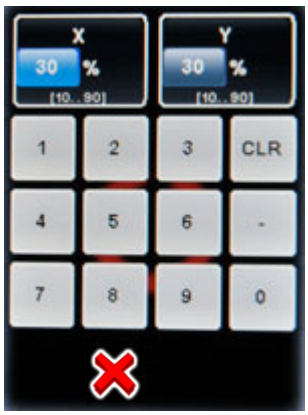
4.1 Editing in quality, speed and turntable modes (continued)

Click on **“overlap”** to change the % overlap between images horizontally and vertically.



Changing the overlap will lead to an automatic recalculation of rows (elevation/images) or number of images per row for the program.

Continue with **“OK”** or cancel with **“X”**.



Enter the **“X overlap”** (horizontal overlap).

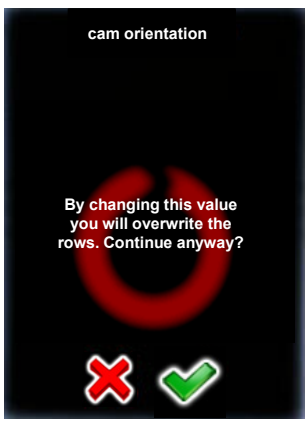
Confirm with **“OK”** or cancel with **“X”**.

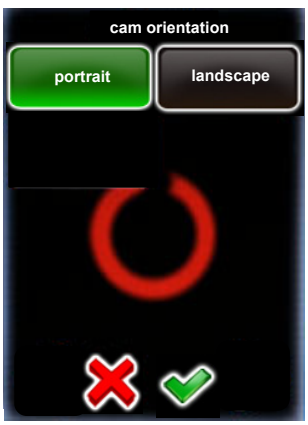
The number of images per row will now be automatically recalculated.

Enter the **“Y overlap”** (vertical overlap).

Confirm with **“OK”** or cancel with **“X”**.

The rows (elevation, number of images) will now be automatically recalculated.



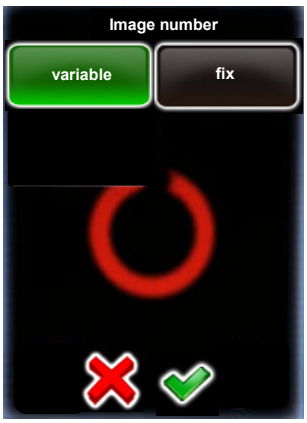


Click on **“cam orientation”** to change the way the camera is attached on the VR Drive.

Changing the camera orientation will lead to an automatic recalculation of rows (elevation/images) or number of images per row for the program.

Continue with **“OK”** or cancel with **“X”**.

4.1 Editing in quality, speed and turntable modes (continued)



Click on **“image number”** to change the way the number of images per row is calculated. This option is only available when using cylindrical angle mode.

- Select “**variable”** to allow every row to have a specific number of images. this option generate the minimum number of images.
- Select **fix** to have the same number of images for all rows. Select this option when using vertical sequences to optimize VR Drive movements. However the number of images will be higher.

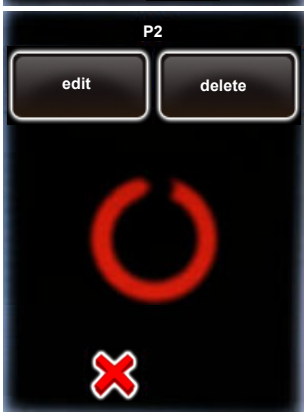
Continue with **“OK”** or cancel with **“X”**.

Click on **“rows”** to create new rows, delete existing rows or edit a row (elevation, number of images).

By changing the rows any previous automatic computation will be overwritten.

By clicking on the button additional rows/images can be added to the program

Select the row by clicking on it.



Select **“edit”** or **“delete”.**

When creating a new row or editing an existing one, enter the desired **elevation** in degrees and the **number of images** per row.

Confirm with **“OK”** or cancel with **“X”**.

4.1 Editing in quality, speed and turntable modes (continued)

Click on **"sequence"** to change the order in which the rows of images are captured.

Select the new sequence.

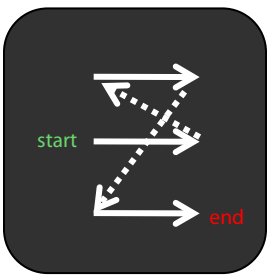
Click on **"next"** to see more sequences.

Confirm with **"OK"** or cancel with **"X"**.

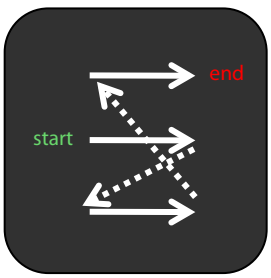
The sequence of image taking is only relevant for multi-row panoramas.

It is designed for those situations where the light changes quickly (for example at sunrise/sunset) or where there is movement in the scene.

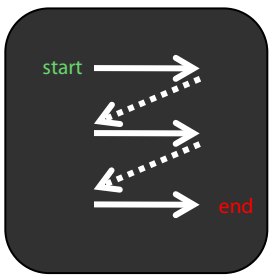
zig-zag center up:



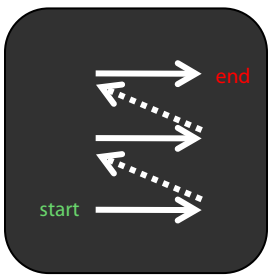
zig-zag center down:



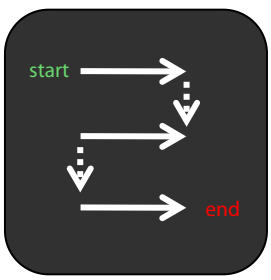
zig-zag top down:



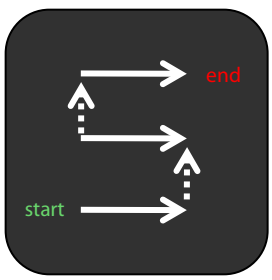
zig-zag bottom up:



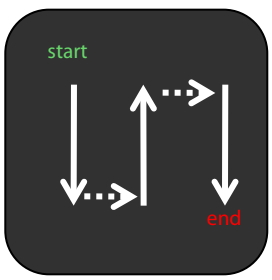
snake h top down:



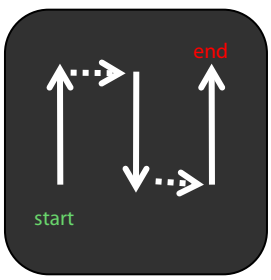
snake h bottom up:



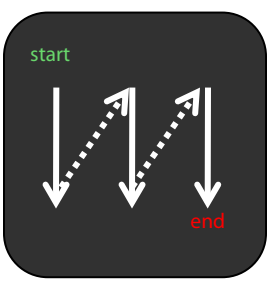
snake v top down:



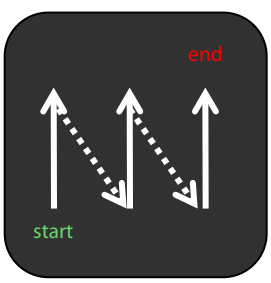
snake v bottom up:



vertical top down:

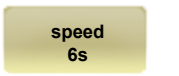


vertical bottom up:



If none of the 10 sequence presets are ideal, use the "manual" angle mode. In this mode the rows (elevation in °, number of images) and their sequence can be customised.

4.1 Editing in quality, speed and turntable modes (continued)



Click on **"speed"** to change the rotation speed for the VR Drive.

Enter the "X speed" for the horizontal movement.

Enter the "Y speed" for the vertical movement.

The minimum speeds are:
- **X: 6 seconds**
- **Y: 10 seconds**

Confirm with **"OK"** or cancel with **"X"**.

Click on **"pause position"** to change the pause at the start or at the end of the capture sequence at 1 position.

The pause start/end position is used to minimise potential vibrations caused by motor movements.

Click on **"pause image"** to change the pause before or after every image.

The pause before/after image is only available when more than one image is taken at every position. It is used for example with long exposure times.

Confirm with **"OK"** or cancel with **"X"**.

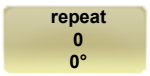
Click on **"release time"** to change the duration of the release signal given by the VR Drive to the camera for every image.

The release time corresponds to the duration of the release signal given from the VR Drive to the camera.

Varying the release time is required to optimise the operation of the VR Drive in "speed" mode.

Confirm with **"OK"** or cancel with **"X"**.

4.1 Editing in quality, speed and turntable modes (continued)



Click on **“repeat”** to program a repetition of the program.

Enter the number of repetitions.

Enter the Offset angle. This will move the starting point of the next repetition in the horizontal direction (X-motor)

Confirm with **“OK”** or cancel with **“X”**.

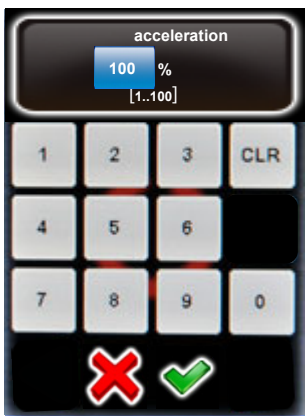
When repeat is set to 2, the program will be done 3 times in total (the original program + 2 repetitions)

If the target is to have overall 2 times the program please set the repeat value to 1.

Click on **“timer”** to program a time delay before the program is launched.

Enter the time delay. This delay is inserted at the beginning of a program (sequence).

Confirm with **“OK”** or cancel with **“X”**.



Click on **“acceleration”** to define the speed adaptation when the VR Drive starts and stops.

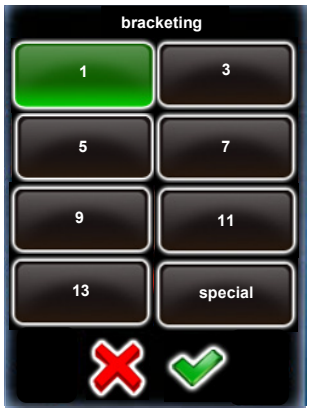
The acceleration values range from 1% (slow speed adaptation) to 100% (fast speed adaptation).

Confirm with **“OK”** or cancel with **“X”**.

4.1 Editing in quality, speed and turntable modes (continued)

Click on **“bracketing”** to program multi-exposures per position.

Bracketing “1” means no multi-exposures – only one image will be released per position.

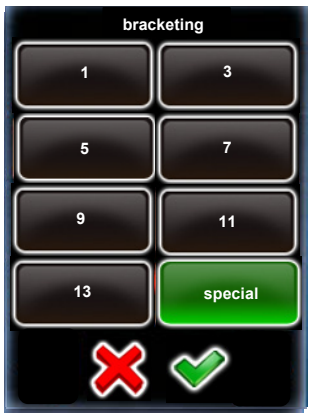


With bracketing “3”, “5”, “7”, “9”, “11” and “13” several images are released per position.

The bracketing values (number of images, bracketing range in f-stops, type of bracketing) need to be set in the camera software.

Make sure that the number of images set in the camera software and in the VR Drive software match.

Confirm with **“OK”** or cancel with **“X”**.



“Special bracketing” is used with cameras which allow the release and bracketing of several images in multi-shot mode.

Set the bracketing and multi-shot feature on the camera.

Enter the total duration of the “multi-shot” in the VR Drive software. The VR Drive will then give a longer release signal to the camera for the multi-shots.

Confirm with **“OK”** or cancel with **“X”**.

Click on **“manual”** to activate or deactivate the manual release of the image in every position:

- Manual **“on”:** requires releasing every picture manually
- Manual **“off”:** releases the images automatically

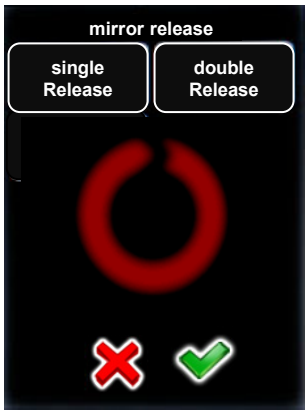
The bracketing of the camera in “quality mode” is limited to +/- 2 EVs (f-stops). For 32-bit HDR photography this is insufficient. With the VR Drive “HDR mode” it is possible to eliminate this limitation. In the “HDR mode” the VR Drive controls the camera software directly, allowing much larger bracketing steps and a larger dynamic range.

4.1 Editing in quality, speed and turntable modes (continued)

Click on **“mirror release”** to activate the release of the camera mirror before image taking.

Enter the duration of mirror release.

Confirm with **“OK”** or cancel with **“X”**.



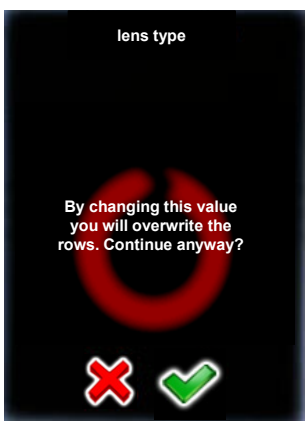
Now choose whether to give a **single or double mirror release signal.**

Typically, Nikon cameras require a single, Canon a double signal.

Confirm with **“OK”** or cancel with **“X”**.

Click on **“orientation”** to change the direction in which the VR Drive turns.

- Orientation**“CW”**: rotates clockwise
- Orientation**“CCW”**: rotates anti-clockwise



Click on **“lens type”** to change the type of lens attached to the camera. It is possible to choose between “**fisheye”** or **“no fisheye”** lens

Changing the lens type will lead to an automatic recalculation of rows (elevation/images) or number of images per row for the program.

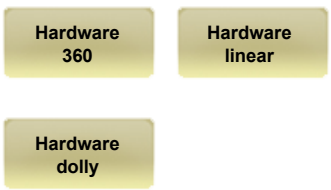
Continue with **“OK”** or cancel with **“X”**.

4.2 Editing in timelapse and video modes

The parameters for the **video and timelapse modes** are very specific. This is why they cannot be changed into another mode (such as quality, speed or turntable).

In the edit menu, the parameters shared with quality mode can be modified in the same way. For example, it is possible to change the **program info text, the camera, the focal length**…

In addition, the video and timelapse modes allows to edit specific parameters. For example the **starting position, points for the video sweep**… only these specific parameters are described in this section.



The **Hardware** parameter allows to define the type of hardware used to generate the time-lapse or the video sequence. As shown in the "Setting up the VR Drive hardware" section the choices are:

- **360:** when using the standard VR Drive with X and Y motor
- **Linear:** when the VR Drive is attached to the linear rail hardware. In this configuration the X motor is used to rotate the camera and the Y motor to slide along the rails
- **Dolly:** when the VR Drive is attached to the special dolly. In this configuration the X motor is used to change direction and the Y motor to rotate the front wheel.

The **image release mode** parameter allows to select the way the images will be released in **timelapse** mode. The choices are:

- **Seconds** to release the images every… seconds
- **Position** to release the images every… degrees

Please note that the **"Hardware"** and **"image release mode"** cannot be edited in this menu as these variables creates an entirely different image release or movement behavior. It is possible to select the correct value during the creation of a new program in the wizard.

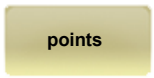
Click on **"start"** to change initial position from which the VR Drive launches the video sweep.

By default, the VR Drive starts from **0° / 0°** to reach the first point defined in the "Program Wizard".

Enter the **"X"** and **"Y"** coordinates of the starting point.

Confirm with **"OK".**

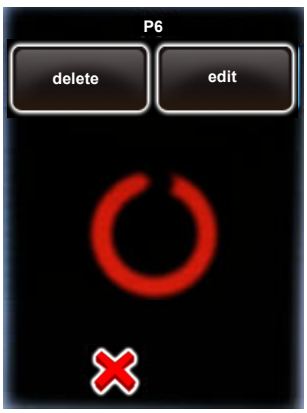
4.2 Editing in timelapse and video modes (continued)



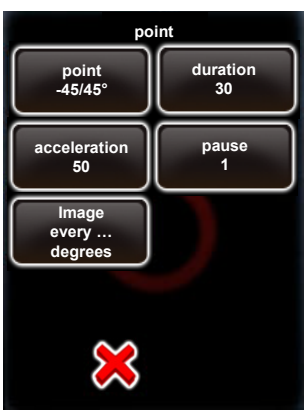
Click on **“point”** to edit the points through which the video sweep navigates.

By clicking on the button additional point can be added to the program

Click on a point to edit or delete it.



Delete a point by clicking **“delete”.**



Edit a point by clicking **“edit”.**

The parameter of a point are displayed and can be edited one by one.

- Point coordinates (X/Y) (degrees or cm depending on hardware)
- Duration
- Acceleration
- Pause
- Image every … degrees (or seconds) (only for timelapse mode)

Click on **“point”** to change its X/Y coordinates.

Use the arrow keys to navigate.

The X and Y coordinate can be either degrees or centimeters depending on the hardware configuration (360, linear or dolly)

Confirm with **“OK”**.

4.2 Editing in timelapse and video modes (continued)

Click on **“duration”** to change the time duration of the video sweep from the previous point to the current one.

Confirm with **“OK”.**

Click on **“acceleration”** to adjust the velocity at which the speed is adjusted.

Select a low value for slow speed adjustment, a high value for fast adjustment.

Confirm with **“OK”.**

Click on **“pause”** to set a pause (in seconds) at the point.

Confirm with **“OK”.**

In “timelapse” mode the “**image release mode”** parameter **(seconds or position)** sets the VR Drive to release one image every few seconds or degrees.

Enter the number of seconds or degrees at which one image is to be released.

Make sure that the camera has enough time to create the images.

Confirm with **“OK”.**

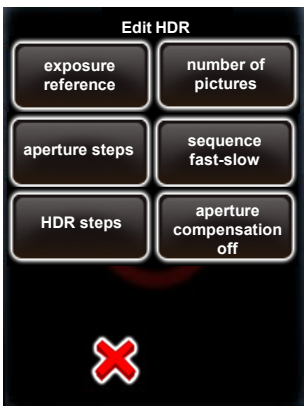
4.3 Editing in HDR mode

The parameters for the **“HDR” mode** are very specific. This is why it cannot be changed into another mode (such as “quality”, “speed” or “turntable”).

In the edit menu, some parameters shared with “quality” mode can be modified in the same way. For example, it is possible to change the **program info text, the camera, the focal length**…

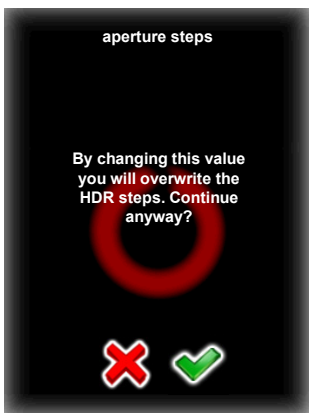
In addition, the “HDR” mode allows to edit specific parameters linked to the bracketing sequence to be taken at each position. For example the **exposure reference, the aperture steps…** only these specific parameters are described in this section.

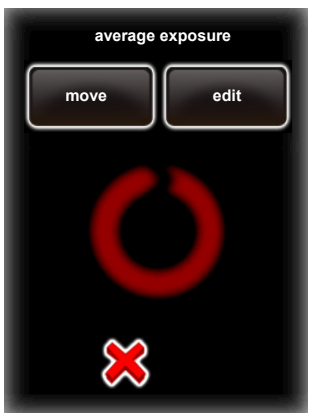
Click on **“mode HDR”** to access all HDR parameters for editing.



All parameters previously set up in the HDR Program Wizard can be accessed and modified.

Click **“exposure reference”** to move or edit the reference exposure speed of the HDR table.



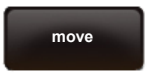


Select **“move”** or **“edit”.**

Confirm with **“OK”.**

The bracketing of the camera in “quality mode” is limited to +/- 2 EVs (f-stops). For 32-bit HDR photography this is insufficient. With the VR Drive “HDR mode” it is possible to eliminate this limitation. In the “HDR mode” the VR Drive controls the camera software directly, allowing much larger bracketing steps and a larger dynamic range.

4.3 Editing in HDR mode (continued)

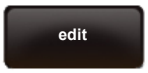


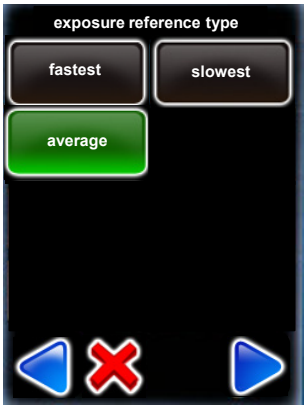
Click on **“move”.**

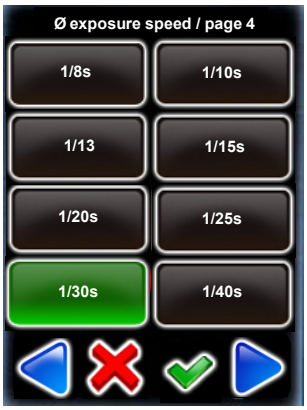
The function **“shift average exposure”** will shift the center exposure of the HDR table.

The values are given in aperture (f-stops).

Confirm with **“OK”.**





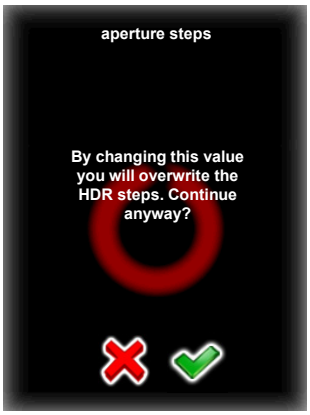


Click on **“edit”.**

Select the **exposure reference type** to be defined (fastest, slowest or average)

Select the **exposure speed,** on which the HDR bracketing will be built.

Confirm with **“OK”**.



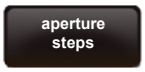
Click on **“number of pictures”.**

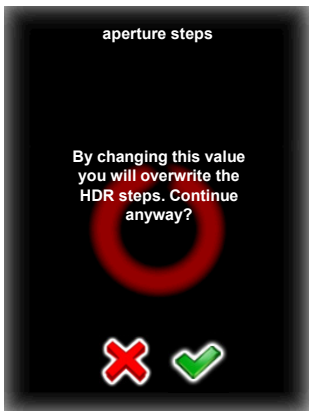
Enter the **number of bracketed images** per position.

For example, with 5 images the VR Drive will release one image at average exposure speed, 2 underexposed and 2 overexposed images.

Confirm with **“OK”**.

4.3 Editing in HDR mode (continued)





Click on **“aperture steps”.**

Enter the **aperture steps** between images.

This corresponds to the difference in f-stops from one bracketing step to the next.

For example, with 3 aperture steps there will be a 3 f-stop difference for every image.

Confirm with **“OK”**.

Click on **“sequence”.**

The **sequence** function defines in which order the images are released.

For example, “middle-fast-slow” will first release the image with average exposure, then the fastest, 2nd fastest, etc., then the slowest, 2nd slowest etc.

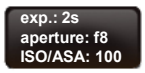
Confirm with **“OK”**.

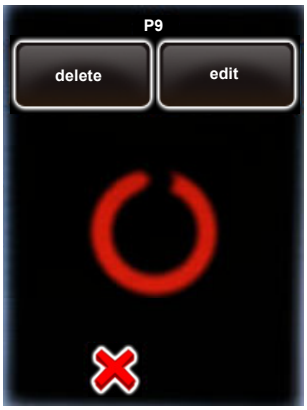
4.3 Editing in HDR mode (continued)

Click on **“HDR steps”.**

The table displays the exposure speed, aperture (f-stop) and ISO/ASA for every image released in the bracketing sequence.

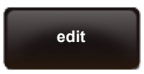
Access any HDR step by clicking on it.

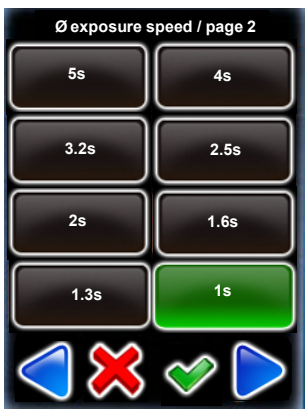


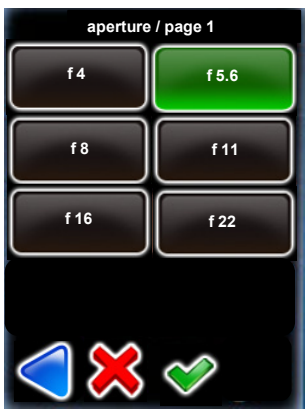


Delete any HDR step by pressing **“delete”.**

Edit any HDR step by selecting **“edit”.**







Select a new exposure speed in the list of possible values.

Confirm with **“OK”.**

Select a new aperture (f-stop) in the list.

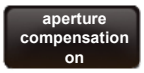
Confirm with **“OK”.**

The VR Drive re-computes the HDR stages and displays a new HDR table.

In this example, the first HDR stage is now set to exposure=1s and aperture f=5.6

Confirm with **“next”**.

4.3 Editing in HDR mode (continued)



Click on **“aperture compensation”.**

Setting this option to “off” will keep the f-stop for all images identical.

With aperture compensation set to “on”, the VR Drive will compensate with f-stops in case an exposure limit is reached (exposure slower than, for example, 30s, or faster than 1/8000s).

Confirm with **“OK”**.

4.4 USB settings

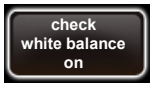
By default, the images are released automatically by the VR Drive using the camera release cable. This is the most stable and reliable way to release the images. For the **cameras compatible with HDR mode** (some Canon and Nikon cameras) it is possible to use the USB cable for image release and for other useful functionalities.

Click on **"USB settings"** to access the USB settings menu of the VR Drive.

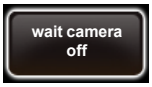
Click on **"USB cable connected"** to turn on the USB functionalities:
- Release with USB cable
- Check white balance
- Wait camera
- Memory check
- Release control
- Check manual mode
- Write identification

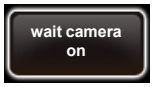
Some functions might not be compatible with all cameras !!

Set the **"Release with USB cable"** to on to allow the VR Drive to release the camera through the USB cable only.



Set the **"check white balance"** to on to test the white balance on the camera when starting a program. The VR Drive displays a warning if the "automatic white balance" is active on the camera. This avoids color mismatch between images.

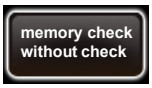


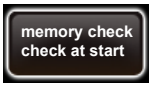


Set the **"wait camera"** to on when using long exposure times. The VR Drive will wait for the "end of images capture" message from the camera before releasing the next image.

The release with the USB cable is not guaranteed under all circumstances. The camera software and communication with the VR Drive, CF card and other factors have an influence on the speed of USB image release.

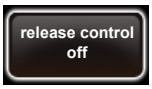
4.4 USB settings (continued)

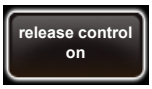




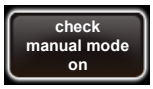
Activate the **"memory check"** to avoid losing images when the memory card is full. Select one of these 3 options

- **Without check**: no memory check is done
- **Stop if full**: the program is stopped when the memory card is full
- **Check at start**: the VR Drive computes the necessary memory for all images in a program. When starting a program it displays a warning if there is not enough space remaining in the memory card





Set the **"release control"** to on when a high number of images are to be captured in a short time. The VR Drive will make sure that every image is released. If not a warning message will be displayed: "cannot reach exposure time"



Set the **"check manual mode"** to "on" to allow the VR Drive to verify if the camera is working in manual mode. If it is not the case it will either change it automatically to manual (whenever possible) or display a warning message.

Set the **"write identification"** to "on" to allow the VR Drive to write image position in the image metadata.

Combined with the **VR Drive image bundler** software, this identification allows an easy image grouping and an automatic image positioning. No need to export any program from the VR Drive. All necessary information is embedded in the images.

Check the section dedicated to the **VR Drive image bundler** software for more details on the **"write identification"** tool

The **"Write identification"** tool will embed specific image position information in the image metadata. Not all HDR compatible cameras can be used. Please check the camera compatibility list in our website to be sure your camera is compatible.

The **"Write identification"** tool will edit specific metadata tags on the camera. In particular:

- Nikon : **"User comment"** tag
- Canon: **"Owner"** and **"Artist"** tags

Any data related to these tags, defined by the user on the camera will be lost. Please make sure to redefine these information on the camera if necessary after using the VR Drive with "write identification" function active.

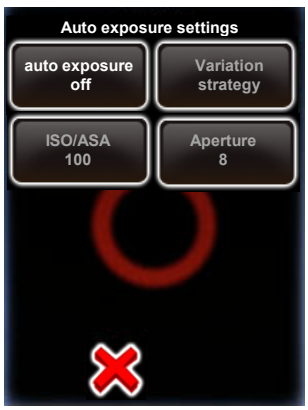
4.5 Auto exposure settings

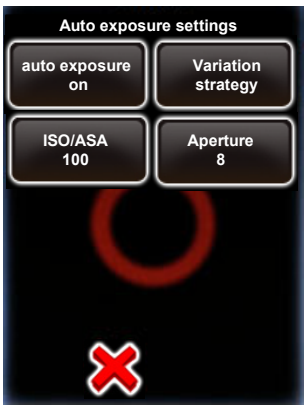
When the **VR Drive light meter sensor** is connected to the VR Drive, and the camera is compatible with VR Drive USB control, it is possible to use the VR Drive in a fully automatic way. **This option is only available for "Quality" and "HDR" modes**

The VR Drive is able to measure the light before starting the image taking. Then, according to the selected strategy and options, the VR Drive will set the correct exposure time, ISO/ASA and aperture on the camera. The image taking process will then start automatically.

This way there is no need to adjust manually the exposure time on the camera or change the HDR reference exposure time before every project. The image taking process is now fully automatic.

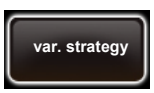
Click on **"auto exposure settings"** to access the automatic exposure settings menu of the VR Drive.

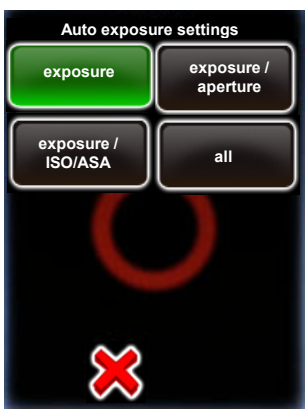




Click on **"auto exposure"** to activate the automatic exposure functionality with light meter sensor.

Then set the following parameters:

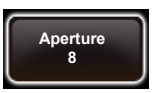




Click on **"var. strategy"** and select the variation strategy to be used:

- **Exposure:** only the exposure time will change according to light. The ISO/ASA and Aperture will be set to the values given on the VR Drive
- **Exposure/aperture:** both exposure and aperture can be changed by the VR Drive according to light
- **Exposure/ISO/ASA:** both exposure and ISO can be changed by the VR Drive according to light
- **All:** The VR Drive will automatically select all 3 parameters according to light

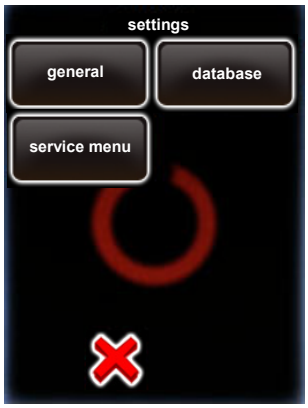
Set a fixed ISO/ASA to be used if the selected strategy is to keep ISO/ASA fixed.



Set a fixed aperture to be used if the selected strategy is to keep the aperture fixed.

4.6 Settings

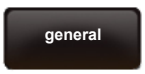
Click on **“settings”** to access the VR Drive settings menu.



The “settings” menu is divided into 3 submenus:

- general
- database
- service menu

4.6.1 Settings/general



Click on **“general”** to access the “general” submenu.

The **“general”** submenu consist of the following functions:

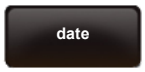
Click on **“language”** to access the “language” function.

Select the language of your choice.

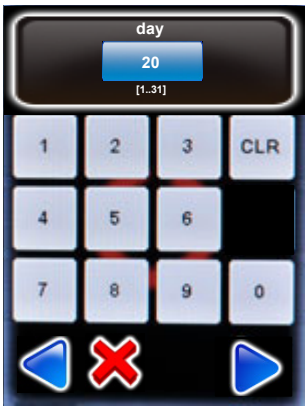
Please note that the language will only be active after closing the “edit program” menu or after restarting the VR Drive.

Confirm with **“OK”.**

4.6.1 Settings/general (continued)

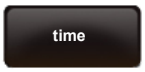


Click on **“date”** to access the “date” function.



Set the year, month and day

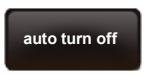
Confirm every entry with **“next”** or cancel with **“X”.**



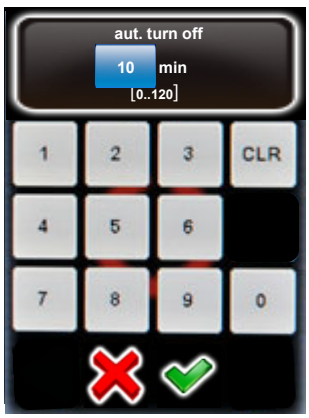
Click on **“time”** to set the hours and minutes of your VR Drive.

Enter the hours and minutes.

Confirm with **“OK”** or cancel with **“X”.**



Click on **“auto turn off”** to define the time for automatic shut down of the VR Drive.



This function is designed to help save battery.

For extended operation times the auto turn off time can be increased.

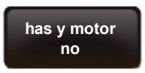
Enter the time in minutes.

Confirm with **“OK”** or cancel with **“X”.**

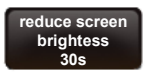
4.6.1 Settings/general (continued)

Click on **“has y motor”** to activate / deactivate the y-motor.

For VR Drive “full” select **“yes”.**



For VR Drive “semi” select **“no”.**



Click on **„reduce screen brightness“** to change time of non activity before the VR Drive reduces the screen brightness.

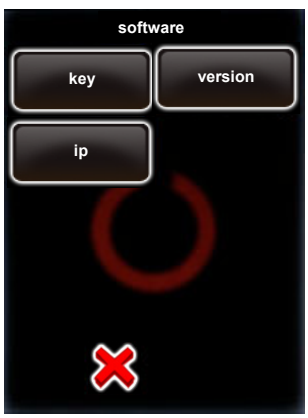
Enter the delay (in s).

If setting this value to 0s the VR Drive will never reduce the screen brightness. This might be useful if outdoor conditions but can use more battery.

The standard value is: 30s

Confirm with **“OK”** or cancel with **“X”**.

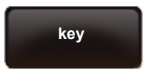
Click on **“software”** to display information on the software



This function consists of

- key
- version
- IP

4.6.1 Settings/general (continued)



Click on **“key”** to display the software key.

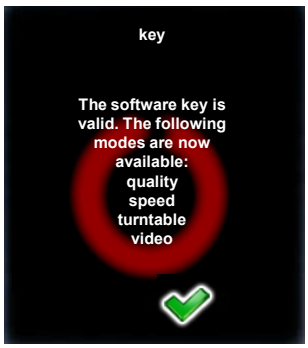
The software key is used to **activate the VR Drive modes** (“quality”, “speed”, “turntable”, “video”, “timelapse”, “HDR”).

This key is **specific to the VR Drive hardware ID**.

It will be delivered with your VR Drive or when upgrading to a new software mode.

If you received a **new key** after upgrading, enter it here.

Confirm with **“OK”.**



After entering a valid key, the software displays **the available software modes.**

When entering an invalid key, the last valid key will be loaded.

Confirm with **“OK”.**

Click on **“version”** to display the software version.

Confirm with **“OK”.**

Click on **“IP”** to display the internet protocol address of the VR Drive.

The IP is required to establish a network connection with the VR Drive Ethernet plug.

This IP must be in the same range as the computer connecting to the VR Drive.

Confirm with **“OK”** or cancel with **“X”.**

4.6.1 Settings/general (continued)

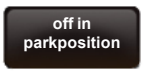
Click on **“hardware ID”** to display the unique hardware identification number of your VR Drive.

This ID is at the same time the serial number and is stored in the “Club VR Drive” database.

Together with the software key this hardware ID activates the VR Drive software mode.

The hardware ID cannot be modified.

Confirm with **“OK”.**



Click on **“off in park position”** to set the preferences for the VR Drive parking position.

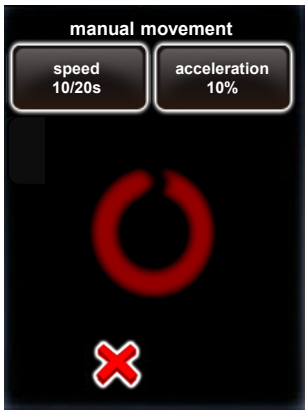
Enter the desired parking position horizontally (“X”) and vertically (“Y”).

For example, to tilt the camera 90° down (for transport), enter:
- X: 0° (or any value)
- Y: -90°

Confirm with **“OK”** or cancel with **“X”.**

4.6.1 Settings/general (continued)

Click on **„manual movement“** to set the preferences for manual positioning of the VR Drive.



Click on **„speed“**.

Enter the speed of X / Y movement (in seconds).

The standard settings are:

- X: 10s
- Y: 20s

Confirm with **“OK”** or cancel with **“X”**.

Click on **„acceleration“.**

Enter the degree of speed adjustment:

- 1%: slow adjustment
- 100%: fast adjustment

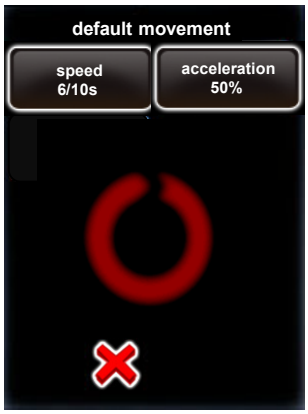
The standard is 10%.

Confirm with **“OK”** or cancel with **“X”**.

The **manual movement** speed and acceleration parameters are used when the VR Drive is moved with the remote radio release or with the touch screen unit for point definition (video mode).

4.6.1 Settings/general (continued)

Click on **„default movement“** to set the preferences for automatic positioning of the VR Drive.



Click on **„speed“**.

Enter the speed of X / Y movement (in seconds).

The standard settings are:

- X: 6s
- Y: 10s

Confirm with **“OK”** or cancel with **“X”**.

Click on **„acceleration“.**

Enter the degree of speed adjustment:

- 1%: slow adjustment
- 100%: fast adjustment

The standard is 50%.

Confirm with **“OK”** or cancel with **“X”**.

The standard movement speed and acceleration is applied when the VR Drive moves from zero position to start a program, back into zero position after a program or from/into a parking position.

4.6.1 Settings/general (continued)

Click on **„diameter linear axis“** to change the size of the wheel used on your linear axis.

Enter the diameter (in mm). Please make sure that the entered value corresponds to the real size of the wheel.

The default size is 151mm.

Confirm with **“OK”** or cancel with **“X”**.

Click on **“rot. Direction linear axis”** to define the positive rotation direction of the main wheel of the linear axis

2 choices are available:
- CW
- CCW

Click on **„ diameter dolly wheels “** to change the size of the wheels used on your dolly.

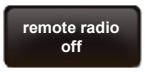
Enter the diameter (in mm). Please make sure that the entered value corresponds to the real size of your dolly.

The default size is 200mm.

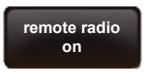
Confirm with **“OK”** or cancel with **“X”**.

The linear rail and dolly parameters might change according to the delivered material. Please make sure to enter the correct values and check with Seitz team if not sure.

4.6.1 Settings/general (continued)

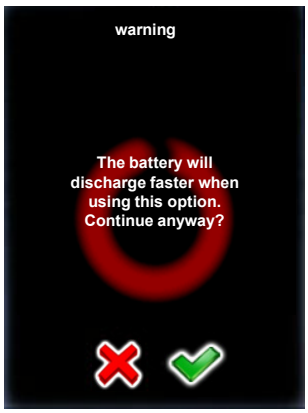


Click on **“wake on radio”** to activate / deactivate the wake-up function of the radio release unit for the VR Drive remote control.



Deactivate the wake on radio with **“no”.**

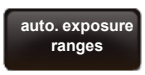
Activate the wake on radio with **“yes”.**



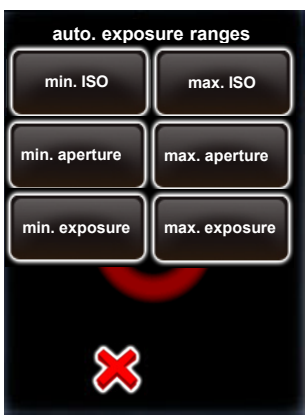
With the radio receiver deactivated it is possible to turn the VR Drive left/right/up/down and to start a program. It is also possible to turn the VR Drive on even if it is switched off.

This is the reason why the battery discharges faster with the radio receiver activated. The VR Drive displays a warning message.

Confirm with **“OK”** or cancel with **“X”**.



Click on **„auto. exposure ranges “** to define the range of values allowed when the automatic light meter tool is active.

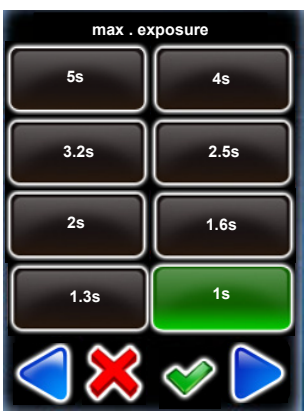


It is possible to define the maximum and the minimum value for the following parameters:

- ISO
- Aperture
- Exposure

This prevents the VR Drive from selecting extreme values to adjust the camera to the current light.

For example, click on **„max. exposure“**.



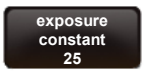
Enter the maximum exposure time allowed. (In this example 1s)

Confirm with **“OK”** or cancel with **“X”**.

In this example the VR Drive will never select an exposure time longer than 1s to avoid too slow image capture.

The auto exposure ranges are applied for all automatically computed values. If a parameter is set manually in the VR Drive these limits are not applied.

4.6.1 Settings/general (continued)



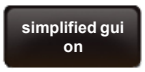
Click on **„exposure constant“** to change the calibration parameter of the light meter.

The standard value is: 25

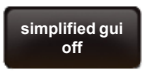
Increase this value if the images are consistently **too dark**.

Decrease this value if the images are consistently **too bright**.

Confirm with **“OK”** or cancel with **“X”**.



Click on **“simplified gui”** to activate / deactivate the simplified gui screen on the VR Drive



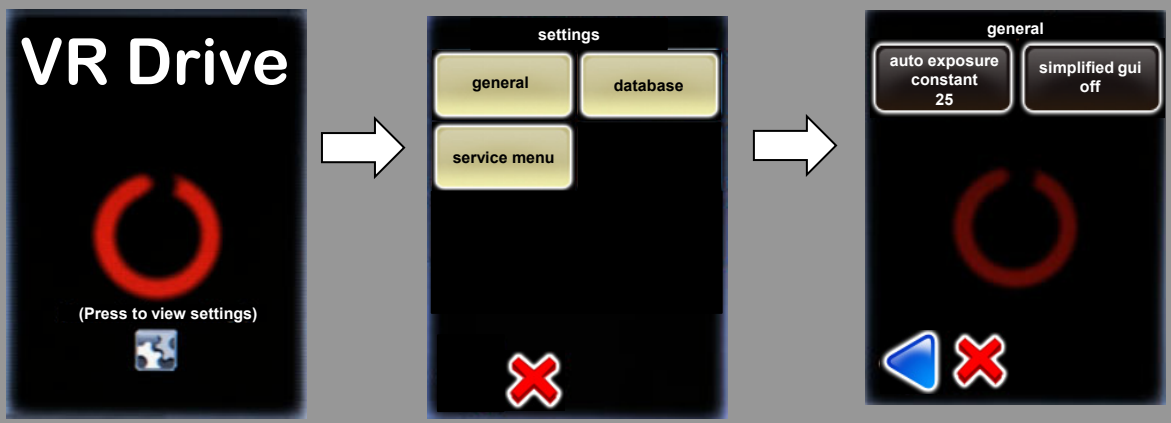
If active, the simplified screen will allow the user only to select a program and to start it. No editing or new program creation is possible

When the simplified gui is active it is not possible to access the edit menu to deactivate it. It is necessary to follow the procedure below:

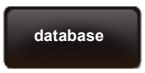
Restart the VR Drive and click on the “Press to view settings section” during start up.

Press “general” and browse the parameter “simplified gui”

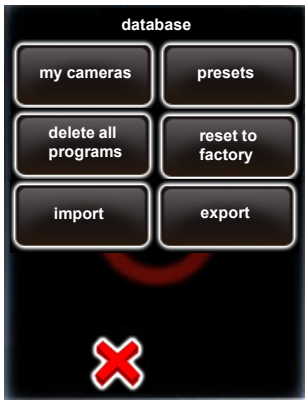
Press “simplified gui” to turn it “off”



4.6.2 Settings/database

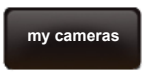


Click on **“database”** to access the database functions of your VR Drive.



The “database” submenu consist of the following functions:

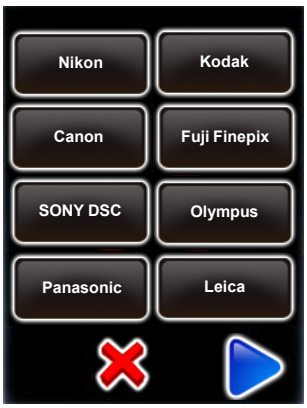
- my cameras
- presets
- delete all programs
- reset to factory
- Import
- export

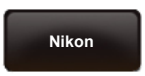


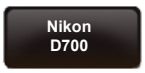
Click on **“my cameras”** to display the list of favourite cameras used with your VR Drive.

Add a new camera by clicking the button.

For example for Nikon D700:

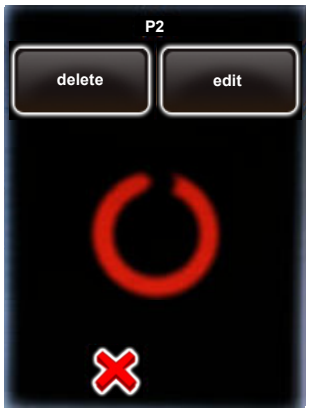


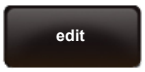




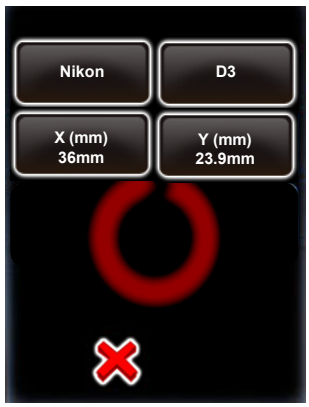
4.6.2 Settings/database (continued)

To **edit** the parameters of a camera, select the **camera.**



Click 

The camera parameters are displayed as follows:

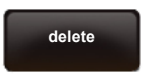


It is possible to edit the sensor size in mm.

Select **“X (mm)” and “Y (mm)”.**

Enter the new values in mm.

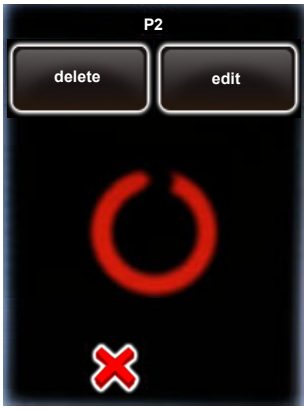
Confirm with **“OK”.**

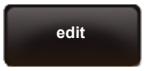
To **delete** a camera from the list, select the camera and click 

The camera will still be in the database, but removed from the “favourites” list.

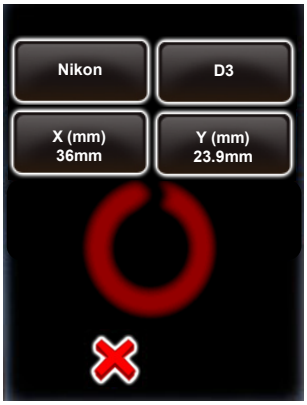
4.6.2 Settings/database (continued)

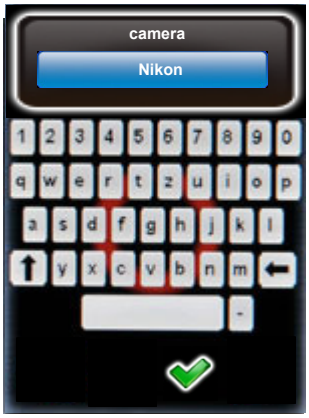
To **add a new camera that is not in the database**, select any camera in the list and overwrite its values.



Click 

The camera parameters are displayed as follows:

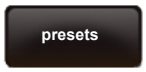




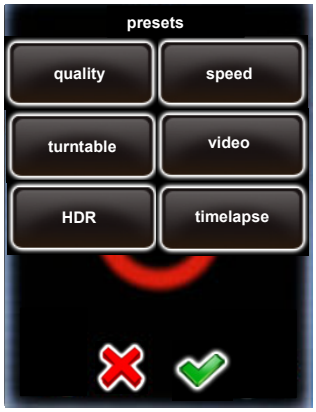
Enter the camera brand, camera type and X/Y (mm).

Confirm with **“OK”.**

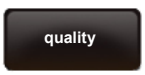
4.6.2 Settings/database (continued)



Click on **“presets”** to define the parameter preferences of your VR Drive.



The “presets” are grouped by software mode:
- “quality”
- “speed”
- “turntable”
- “video”
- “HDR”
- “timelapse”



Click on **“quality”, “speed”, “turntable”, “video”, “timelapse” or “HDR”** to set up the presets.

Click on the preset to modify, for example:

When always using the same camera, it may be more efficient to set the **A-value** to a preset. This way, this value will always be automatically loaded every time a new program is created.

The table on the following pages summarises all program parameters created in the **“Wizard”** or loaded as **“presets”** for the different VR Drive modes.

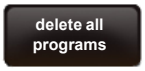
4.6.2 Settings/database (continued)

	units	function	quality	speed	turntable	timalapse	video	HDR
info	text	Information on project	✓	✓	✓	✓	✓	✓
camera	text	Camera brand + type; used for automatic calculation of rows in “quality” and “speed” mode	✓	✓	✓	✓	✓	✓
focal length	mm	For automatic calculation of rows in “quality” and “speed” mode	✓	✓	✓	✓	✓	✓
A/B value	mm	Information to determine center and nodal points	✓	✓	--	--	--	✓
angle mode	various	Automatic calculation of rows (cylindrical, spherical) , manual or visual programming	✓	✓	--	--	--	✓
X-FoV	degrees	Horizontal angle (field of view)	✓	✓	✓	--	--	✓
Y-FoV	degrees	Vertical angle (field of view)	✓	✓	--	--	--	✓
Nb images	fix/var	Use fixed or variable number of images for every row	✓	✓	--	--	--	✓
rows	elevation: ° images: #	Position of image release in X/Y dimension	✓	✓	✓	--	--	✓
lens type	fisheye non-fisheye	Fisheye or traditional lens (non-fisheye) – to compute rows	✓	✓	--	--	--	✓
force nadir	on/off	Force the VR Drive to take a nadir shot in spherical angle mode	✓	✓	--	--	--	✓
start/end Y	degrees	Vertical FOV to distribute rows in angle mode “manual”	✓	✓	✓	--	--	✓
start angle X/Y	degrees	Starting point coordinates in visual angle mode	✓	✓	--	--	--	✓
end angle X/Y	degrees	End point coordinates in visual angle mode	✓	✓	--	--	--	✓
sequence	various	Sets the direction of image release (zig-zag, vertical, snake, center-up, center-down, top-down, bottom-up)	✓	✓	--	--	--	✓
speed X/Y	seconds	Speed in x and y dimension from position to position	✓	✓	✓	--	--	✓
bracketing	1x..9x, special	Number of multiple releases per position; special for continuous signal	✓	--	✓	--	--	--
pause before/after	seconds	Pause before or after releasing the image or position	✓	--	✓	✓	--	✓
ref exposure speed	seconds	Average exposure speed on which the HDR table is built	--	--	--	--	--	✓

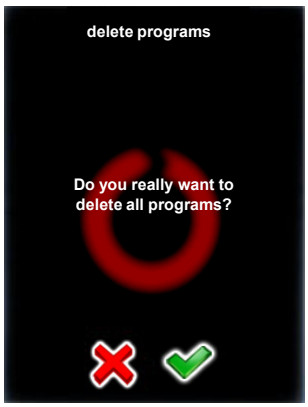
4.6.2 Settings/database (continued)

	units	function	quality	speed	turntable	timalapse	video	HDR
aperture	f	f-stop on the lens used for the HDR exposure	--	--	--	--	--	✓
ISO/ASA	ISO/ASA	ISO/ASA used for the HDR exposure	--	--	--	--	--	✓
Nb bracketed images	#	Number of images released per position/bracketing for HDR	--	--	--	--	--	✓
aperture steps	f	Difference in f-stops from one bracketed image to the next for HDR	--	--	--	--	--	✓
exp sequence	various	Fast to slow or slow to fast exposure times	--	--	--	--	--	✓
aperture compensation	off/on	Option to compensate exposure speeds at limit with f-stop for HDR	--	--	--	--	--	✓
HDR steps	table	Table of exposures, f-stops and ISO/ASA for every bracketed image	--	--	--	--	--	✓
release mode	second/ position	Defines the way the images will be released in timelapse mode	--	--	--	✓	--	--
start point X/Y	degrees	Starting position for video in X/Y dimension	--	--	--	✓	✓	--
points	degrees, seconds	For definition of every point in video sweep: X/Y position, speed between points, acceleration (degree of speed adaptation), pause at every point	--	--	--	✓	✓	--
image every ... sec/deg	seconds/ degrees	release of images between points in timelapse mode	--	--	--	✓	--	--
overlap	%	Overlap between images horizontally (X) and vertically (Y)	✓	✓	--	--	--	✓
orientation	CCW, CW	Direction of rotation – counter-clockwise, clockwise	✓	✓	✓	✓	✓	✓
release time	seconds	Time during which the VR Drives gives a release signal to the camera	✓	✓	✓	✓	--	✓
repeat	X, degree	Number of times a program is repeated with offset angle	✓	✓	✓	✓	✓	✓
timer	seconds	Delay time before a program sequence is launched	✓	--	✓	✓	--	✓
manual release	off/on	Manual release of camera in every position	--	--	--	--	--	✓
mirror release	seconds	Time for release of camera mirror prior to image-taking	--	--	--	--	--	✓
acceleration	%	Degree of speed adaptation (1% slow, 100% fast)	✓	✓	✓	--	--	✓

4.6.2 Settings/database (continued)



Click on **“delete all programs”** to remove all programs from your VR Drive.



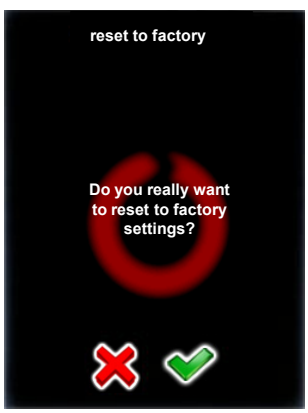
Confirm with **“next”** or cancel with **“X”.**

After deleting all programs a default program in “quality” mode will be stored as “P1”.

All settings (general (time settings etc.) and database (camera, presets) will remain unchanged.

Click on **“reset to factory”** to remove all programs and reload the default factory settings.

Confirm with **“next”** or cancel with **“X”.**



After deleting all programs a default program in “quality” mode will be stored as “P1”.

The settings (general (time settings etc.) and database (camera, presets) will be created from factory settings.

4.6.2 Settings/database (continued)

For importing and exporting data please connect the **original Roundshot USB stick** into the USB slot of the VR Drive.

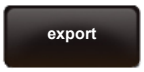
Important: The USB stick needs to be inserted prior to loading the import or export commands.

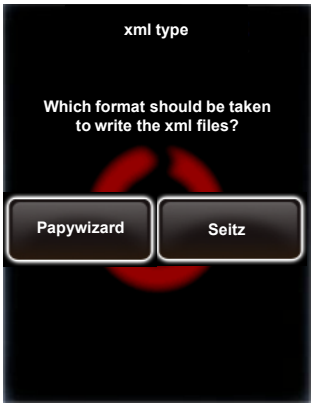
Click on **"import"** to load previously backed-up VR Drive programs.

If a program number already exists in the VR Drive there are two options:
- Overwrite the existing program number with the imported one
- Append the existing program to the VR Drive programs

Confirm or cancel with **"X".**

The programs are loaded to the VR Drive.



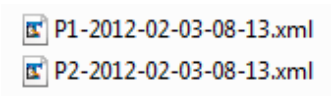


Click on **"export"** to export program settings.

The **"Papywizard"** option exports the exact location (pitch/roll) of every image released in the program sequence to an xml file in the papywizard standard. This **xml file** can then be used in the stitching software for accurate allocation of images .

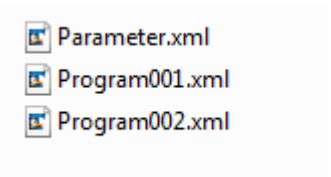
The **"Seitz"** option exports all programs to **back-up files** that can be shared between VR Drives or can be re-imported later, for example after a reset to factory settings.

Papywizard format



(for stitching software)

Seitz format



(for back-up / can be reimported into VR Drive)

Back up your programs in the Seitz format from time to time. This ensures that no program data is lost in the case that the VR Drive has to be reset to factory settings.

4.6.3 Settings/service menu

The **service menu** is only used for factory maintenance (hardware calibration).

5. Tips & Tricks

5.1 Nodal point

When creating a new program with the Wizard, you can apply the following procedure for finding the correct nodal point:

Select the **camera** that you would like to use for the new program from your favourites list.

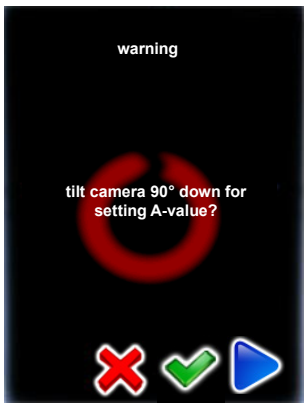
Confirm with **"next".**

If the desired camera is not in the list, exit the Wizard by clicking **"X"** and add the camera in the "program edit/settings" menu. Please refer to section 4.3 for details.

Enter the **focal length** of the camera lens.

This value must correspond with the exact setting on the lens. It is used – together with the camera sensor size – to automatically calculate the number of rows and images.

Confirm with **"next".**



For VR Drive "full" (with y-motor):

The VR Drive will now ask the user whether it should move the camera 90° downwards for setting the centre point of rotation (A value).

If you already know the A-value, choose **"cancel**" and enter the A-value in the following window.

If not, select **"Yes"** to move the camera 90° down. Be careful not to squeeze your hand between camera and y-motor.

For VR Drive "semi" (without y-motor):

There will be no VR Drive message.

If you already know the A-value when using the same camera/lens in previous projects, enter the A-value in the following window.

If not, move the camera 90° down. Be careful not to squeeze your hand in the moving VR Drive vertical arm.

5.1 Nodal point (continued)

Look through the camera viewfinder, open the VR bracket holder and slide the VR bracket sideways so that the centre of the viewfinder is exactly on the centre cross of the rotation axis.

Read the exact **A-value** (in mm) on the scale of the VR Holder.

Enter the exact **A-value** (in mm) in the software.

When the camera was moved 90° down with a VR Drive “full”, it will be lifted back up into the 0° position after confirming with **“next”.**

For VR Drive “semi” lift the camera manually back up into the 0° position.

5.1 Nodal point (continued)

The next step consists in setting the **nodal point** for the camera.

The correct point about which to pivot a camera for panoramic photography is the **centre of the system's entrance pupil**.

Good nodal point:

Bad nodal point (parallax effect):

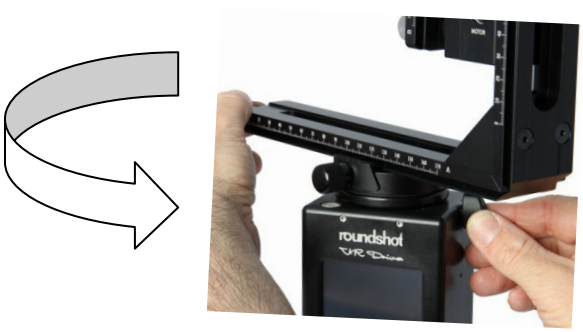
In practice, when turning the camera sideways, the **relative distance between two objects**
• **always remains the same** when the camera is at the correct nodal point
• changes when the camera is not at the correct nodal point

There are **two nodal points**: the front and rear nodal point. The position of the entrance pupils for panoramic photography is a function of the **camera hardware** (distance from camera rear to lens), the **construction of the lens** itself (centre of perspective), the **zoom setting** on the lens and finally the **focusing.**

As there are **virtually unlimited combination possibilities**, it is not possible to store all nodal points for all cameras, lenses, zoom positions and focusing distances. Therefore it is necessary to calibrate the nodal points for your camera + lens combinations yourself.

There is a simple practical procedure to determine the nodal point:

Open the quick adaptor release so that the VR bracket and camera can be moved sideways:

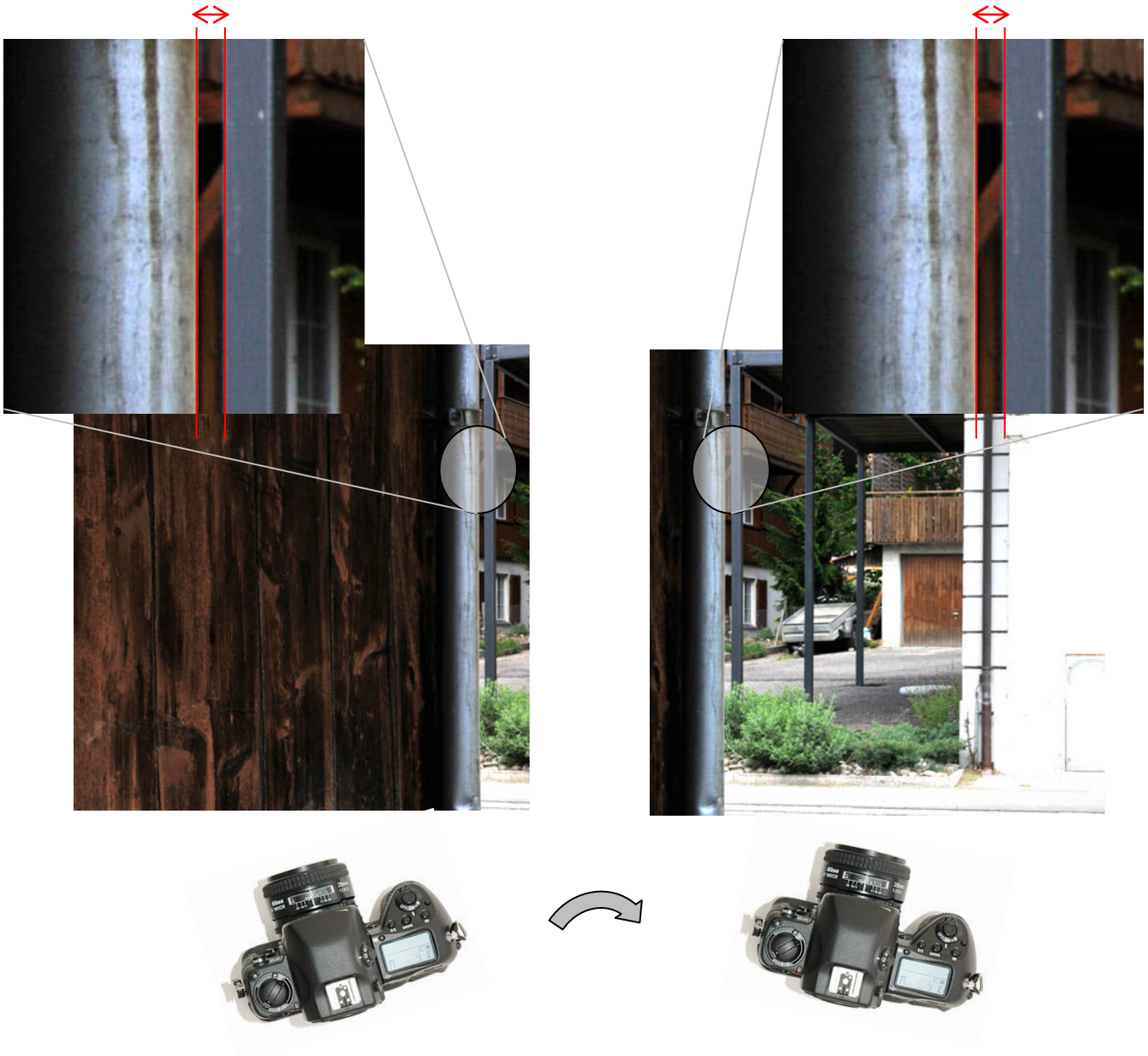


5.1 Nodal point (continued)

Choose **two vertical lines in space**, for example the edge of a building with a pillar in the background.

Look through the viewfinder and position the camera so that the edge of the building is at the right margin of the image.

Then move the camera clockwise (to the right) so that the edge of the building is now on the left margin of the image.



If the distance between the two lines moves, the camera is not at the correct nodal point.

If the distance between the two lines remains constant, the camera is in the correct nodal point.

Close the quick adaptor release.

5.1 Nodal point (continued)

Now read the **B-value** off the nodal rail (in mm):

Enter the exact **B-value** (in mm) in the software.

Confirm with **“next”**.

This procedure must be repeated every time a new camera/lens/focal length/focusing combination is used.

For security reasons, repeat this procedure every time a new program is set up or after reattaching the camera on the VR Drive.

Setting the correct nodal point is essential for successful stitching of the images. If the nodal point is not correctly set, it may be that the panorama cannot be stitched and that it is necessary to repeat the image capture.

When detaching/reattaching the digital camera there is a risk that the zero position of the camera changes. Make sure that you always attach the camera at the very same position. Slide the camera body to the rear metal base to make sure that there is no deviation.

When using larger cameras with larger lenses the nodal bench rail may not be long enough. Instead of sliding the zero position of the camera on the rail we strongly recommend to use a second – larger – nodal bench rail for long lenses and attach the camera always at the very rear metal base. This avoids any potential error when using different cameras/lenses.

5.2 Roundshot Image Bundler

After few hours of work with the VR Drive the memory card of your camera will contain a large number of images belonging to different programs.

The **Roundshot Image Bundler** is a dedicated software able to group all images taken with the VR Drive by project. This is a great help to **reduce the image sorting time and to avoid image grouping errors**. It is also able to detect projects with redundant images (pause + redo) or incomplete panorama sets (missing images).

Additionally, there is no need to export programs out of the VR Drive. The camera position and direction is directly embedded in the images. The image bundler is able to generate **the correct XML file for every set of images**.

The Roundshot Image Bundler is available for both Windows (64bit) and Mac (64bit) operating systems. You can download the installer from our "**club"** web page:

http://www.roundshot.com/xml_1/internet/en/application/d169/f155.cfm

Before using the Roundshot Image Bundler please make sure your camera is compatible with this function on our camera compatibility page:

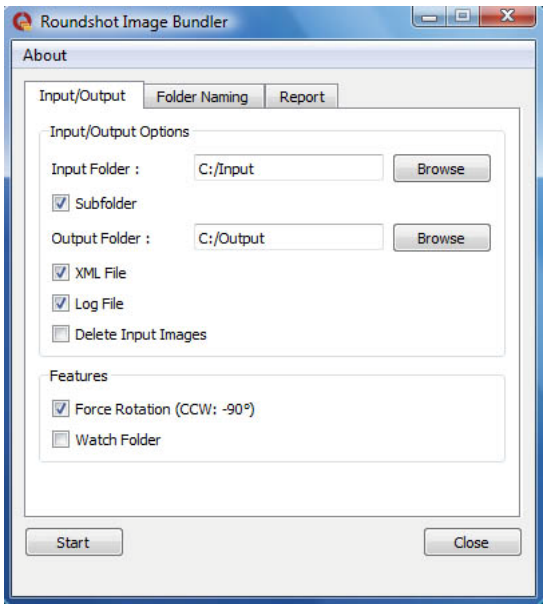
http://www.roundshot.com/xml_1/internet/en/application/d77/d78/f86.cfm

To use the image Bundler, the VR Drive needs to write camera position and direction in every image metadata. It is therefore necessary to connect the VR Drive and the camera with a USB cable.

It is also necessary to activate the **"Write identification"** tool in the USB settings as shown below:

5.2 Roundshot Image Bundler (continued)

To use the image bundler, install the software corresponding to your operating system (Windows or Mac) and follow the tutorial below:



Start the Roundshot Image Bundler and set the following parameters:

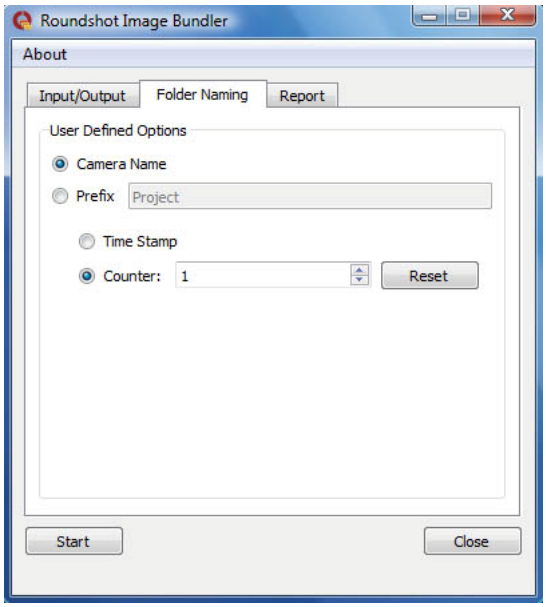
- **Input folder:** location of the images to be sorted
- **Subfolder:** activate this option to include all images located in subfolders of “input”
- **Output folder:** location where the software will save the sorted images
- **XML file:** if active the Papywizard XML file is generated for every set of images and stored in the same folder
- **Log file:** if active a log file summarising the image grouping process is generated for every set of images and stored in the same folder. This file shows if there is any missing or redundant images
- **Delete input images:** if active the images in the input folder will be moved to the output folder. This option allows faster grouping and low memory usage.
- **Force rotation (CCW:-90°):** when active all images will be rotated 90° CCW to compensate for the camera orientation.
- **Watch folder:** when active the image bundler will continuously search for images to be sorted in the input folder. Any new copied image will be automatically sorted until the stop button is pressed or the software is closed.

Most cameras are not able to define the correct camera orientation at the nadir and zenith. It is therefore recommended to deactivate any automatic image rotation on the camera. Then use the **Force rotation** function to rotate all image 90°CCW.

When the **watch folder** option is active it is not possible to keep the images in the input folder. This folder is used as “hot folder” and any incoming new image will be sorted and moved to the output folder.

5.2 Roundshot Image Bundler (continued)

Before starting the image grouping process, it is possible to define the following folder naming options:



Every folder name is composed by 2 elements.

The first element can be either the **camera name** or a user defined **prefix.**

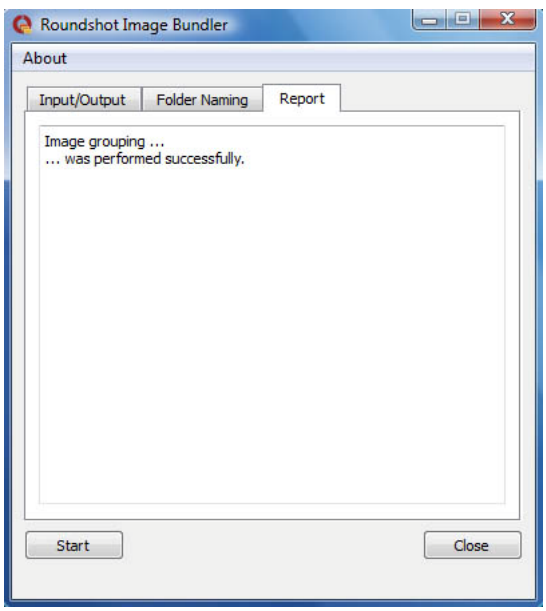
The second element can either be the **project timestamp** or a simple **counter**.

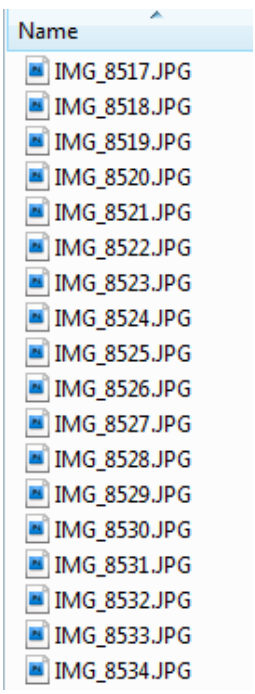
It is possible to reset the counter when needed.

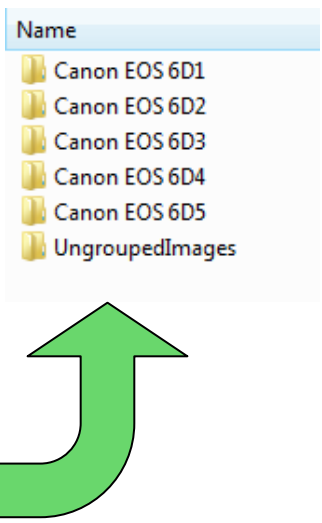
Once all parameters are set, press **Start.** The image grouping will start automatically and a short report is generated in the **Report tab.**

An example of image grouping is shown below. **Every folder contains 1 set of images as well as the Papywizard XML file.**

The **"UngroupedImages"** folder contains all images that could not be grouped (for example images taken manually with your camera without VR Drive).



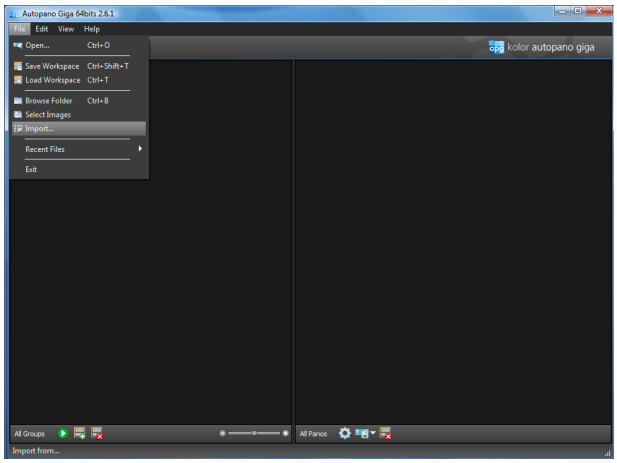




5.3 Stitching workflow

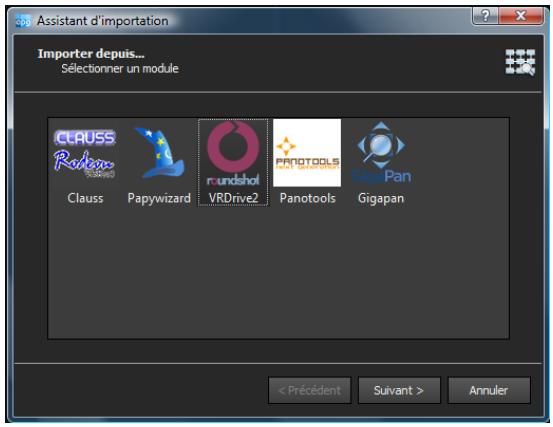
The images can be stitched using any stitching software. As the VR Drive can export xml files defining the position of every image in “Papywizard” format, we recommend using software compatible with “Papywizard”. Here are two examples:

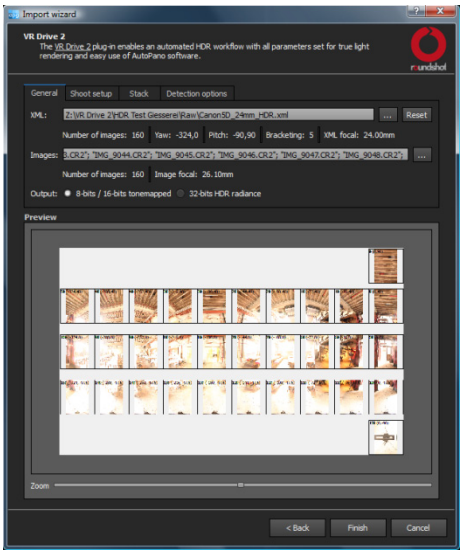
AutoPano + AutoPano Giga (Kolor)



Go to **File/Import** and load the xml file from your computer into the AutoPano software.

Use the **Roundshot VR Drive 2** plugin.

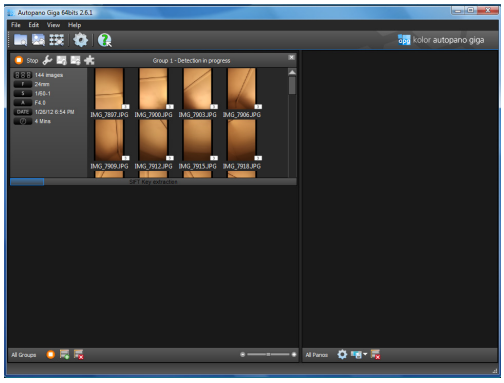




After selecting the **path of the xml file**, select the **path for loading the images**.

The software now allocates the image sequence to their **exact position** in the panorama.

A **preview** is displayed.



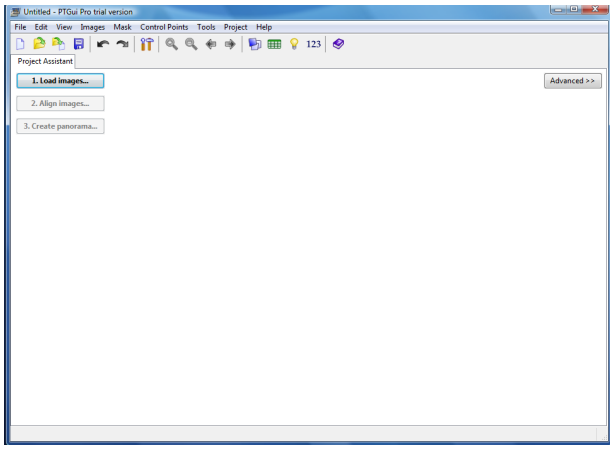
After clicking **“finish”** the import Wizard is complete and the **automatic feature detection** is started.

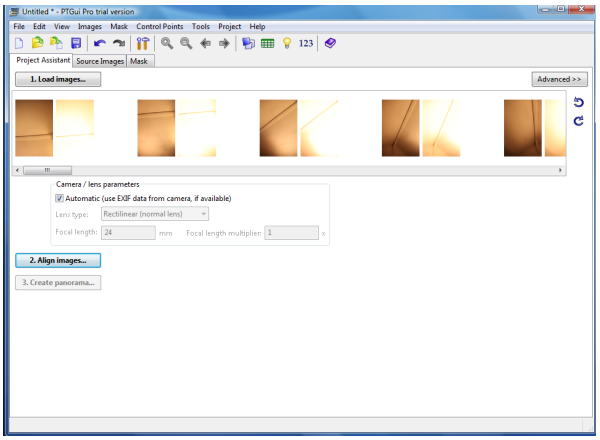
Continue with the **stitching workflow** until final rendering of the panorama.

The xml file significantly enhances consistency and efficiency for the stitching of the final panorama.

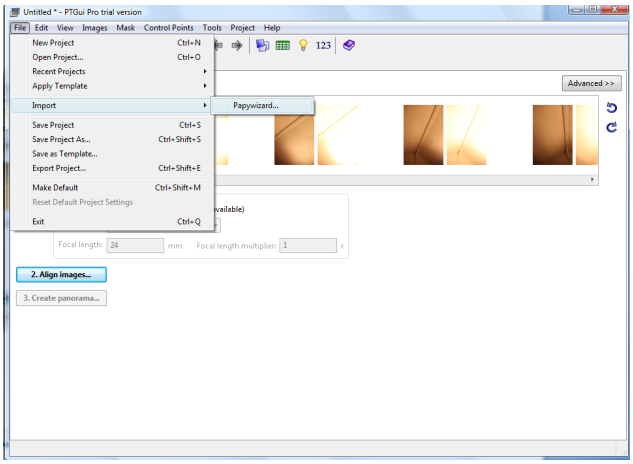
5.3 Stitching workflow (continued)

PTGUI


Untitled - PTGui Pro trial version
File Edit View Images Mask Control Points Tools Project Help
Project Assistant
1. Load images...
2. Align images...
3. Create panorama...
Advanced >>

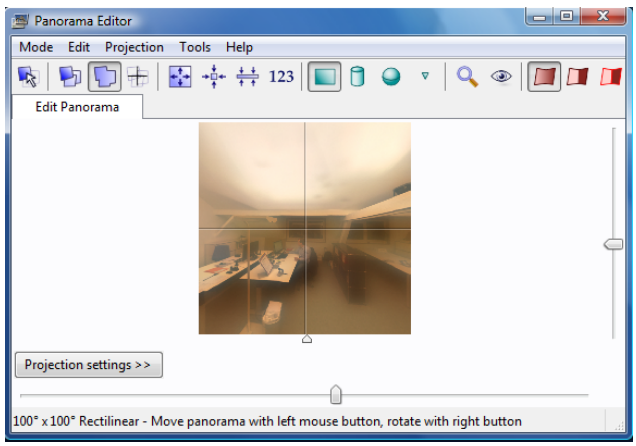


As a first step **load your images** into the PTGUI software.



Then go to **File/Import/Papywizard** and allocate the matching **xml file** to the images.

The software now allocates the image sequence to their **exact positions** in the panorama.


Panorama Editor
Mode Edit Projection Tools Help
Edit Panorama
Projection settings >>
100° x 100° Rectilinear - Move panorama with left mouse button, rotate with right button

A **preview** is displayed.

Continue with the **stitching workflow** until final rendering of the panorama.

The xml file significantly enhances consistency and efficiency for the stitching of the final panorama.

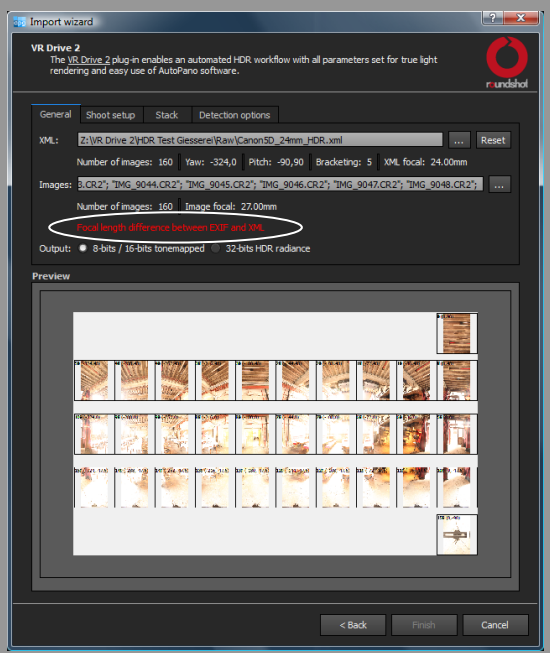
5.3 Stitching workflow (continued)

With the xml file and the AutoPano Giga VR Drive plug-in, the stitching process is very straightforward. All parameters should lead to correct stitching by default.

The only remaining task is the optimization of the final panoramic image and special parameters editing.

However, two main errors might appear during this process. These errors are due to differences between xml file and metadata or due to metadata problems. These panoramas can nevertheless be stitched following these recommendations:

Focal length mismatch:



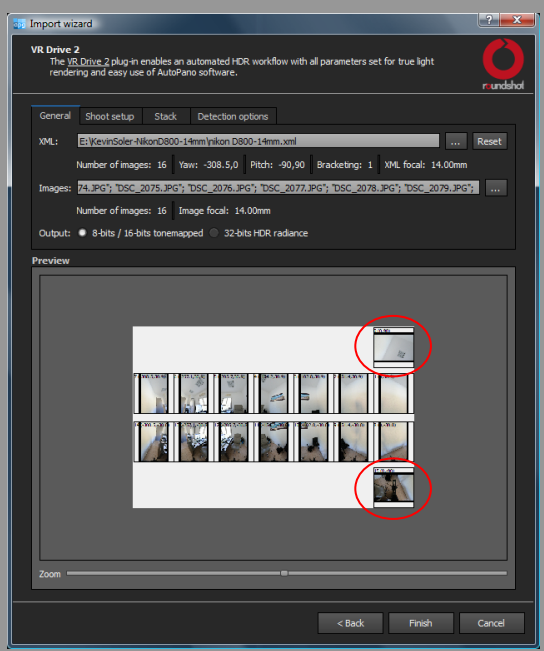
In the import wizard, after loading the images and the xml file, the following error message might be displayed: “Focal length difference between EXIF and XML”.

This might lead to stitching errors.

It is however possible to stitch the images correctly by opening the tab “Shoot setup”, and select the focal length used during the shooting.

To avoid this problem, please make sure to enter the correct focal length and camera in the VR Drive before starting a program.

Zenith/nadir image orientation:



In the import wizard, after loading the images and the xml file, the nadir and the zenith images might appear with a different orientation compared to all other images (in the preview panel).

This error is due to wrong orientation tag written by some cameras at nadir or zenith positions (For example with the Nikon D800).

To solve this problem it is necessary to edit the orientation metadata of these 2 images using an external software like “Photome”. You can write the same value as for the other images.

After saving this new tag import the images again and proceed with stitching.

5.4 Mask the nadir

When generating a full spherical panorama, it is possible to see the tripod and the VR Drive x-motor in the nadir. These 2 elements are fixed and cannot be removed by anti-ghosting software.

On top of that and depending on the software used for stitching, additional elements might be visible such as connection cables or the VR Drive L-bracket. These elements are moving with the camera and therefore will appear as transparent objects (ghosts) in the image.

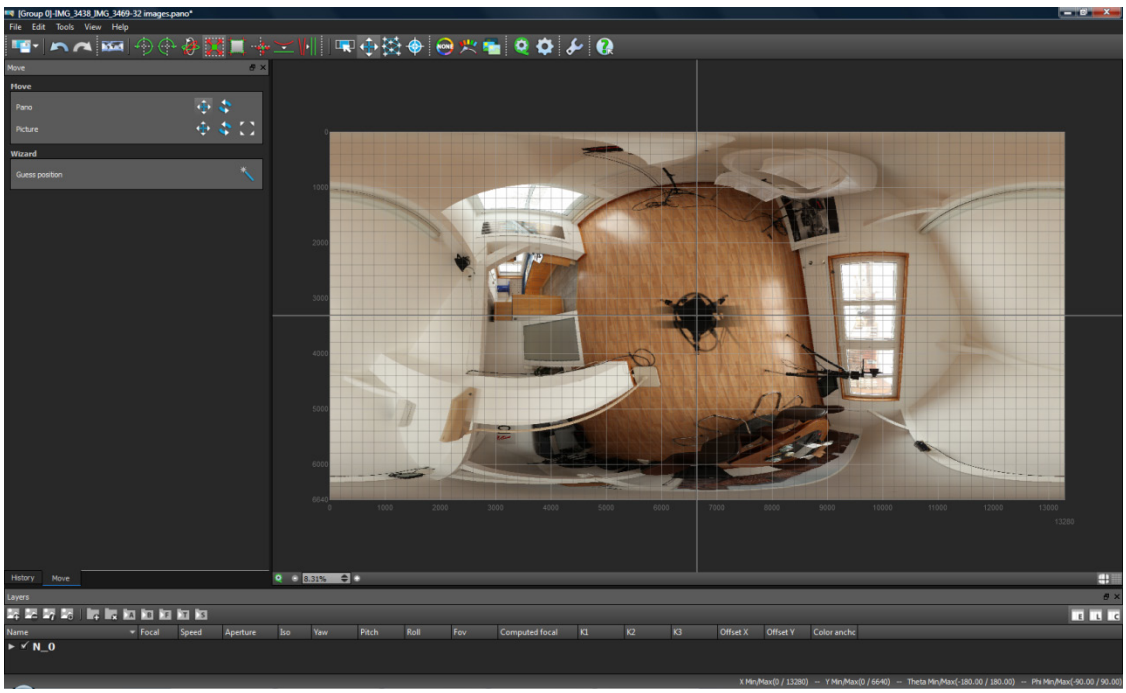
In this section we explain two methods for masking and cleaning the nadir of your panorama.

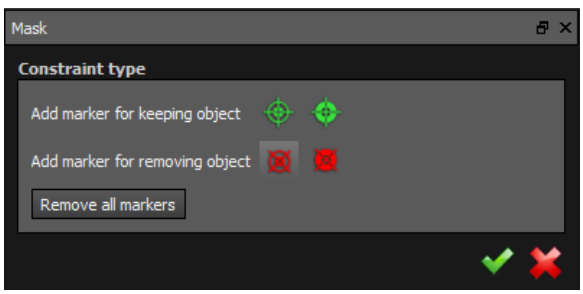
Removing moving elements using Autopano

After generating the panoramic image, open the **Edit panorama** menu.

Move the nadir of the panorama to the centre using the move tool.

We can now see here all elements described above (tripod, x-motor, cables, L-bracket)





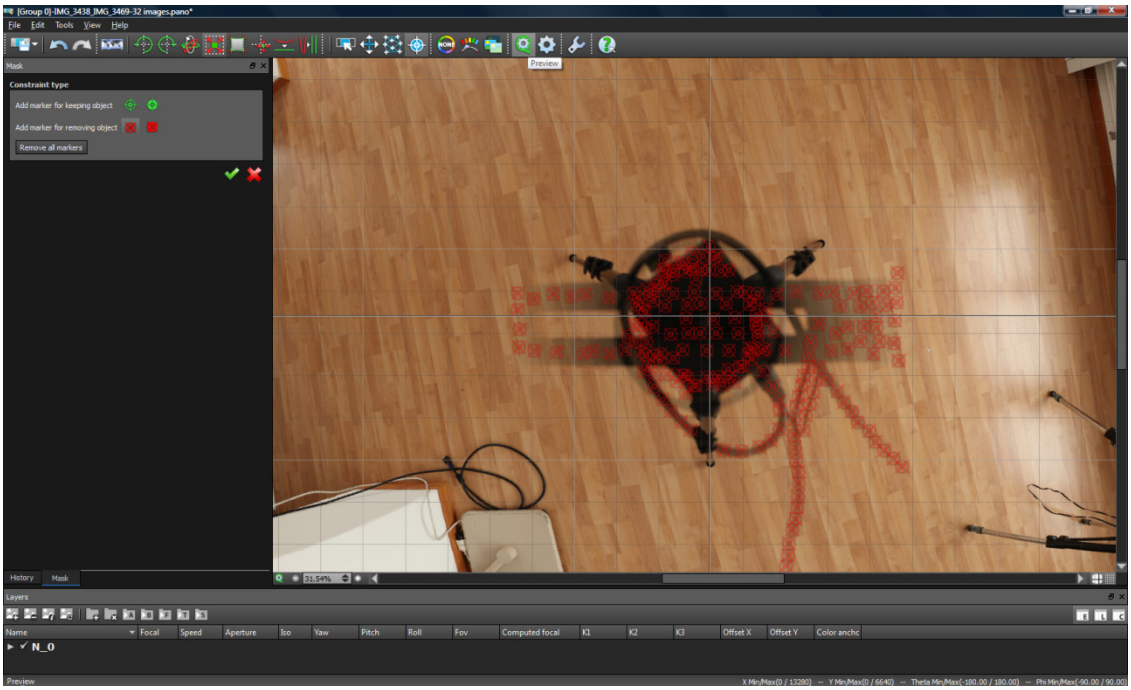
Use the **Mask tool** to select all elements to be removed from the final panorama.

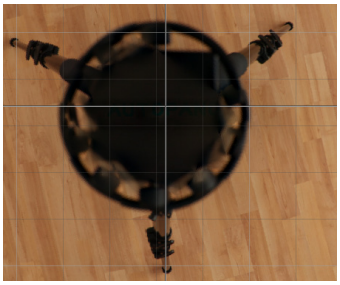
It is possible to use the **“single image”** selection or the **“entire stack”** selection when working with HDR images

5.4 Mask the nadir (continued)

As you can see in the following example, all moving elements in the nadir area are selected with the red selection tool. The tripod is not selected as it is fixed and cannot be removed using this tool.

The selection must be done on all images of this layer.





Once the selection is done, click on preview to see the final result.

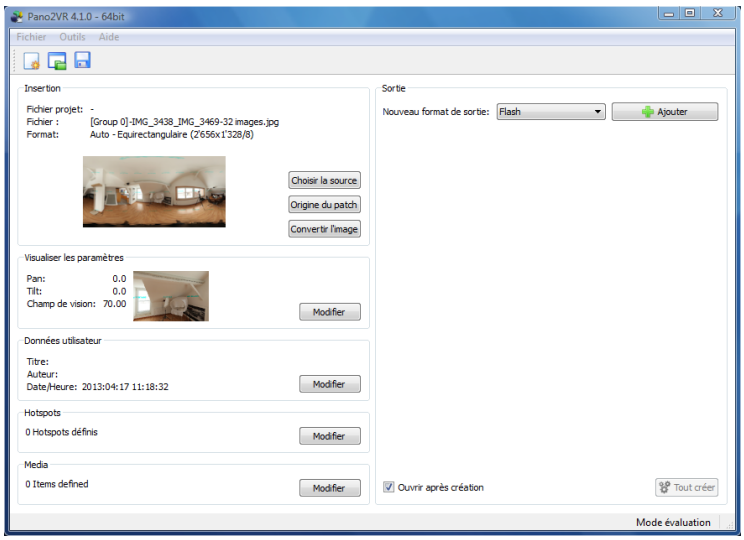
As you can see all moving elements were removed. Only fixed elements remains (tripod, x-motor)

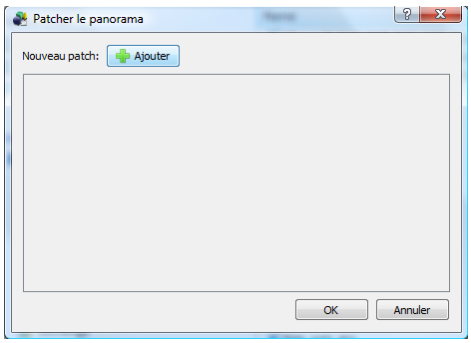
5.4 Mask the nadir (continued)

Removing the remaining fixed elements with pano2VR

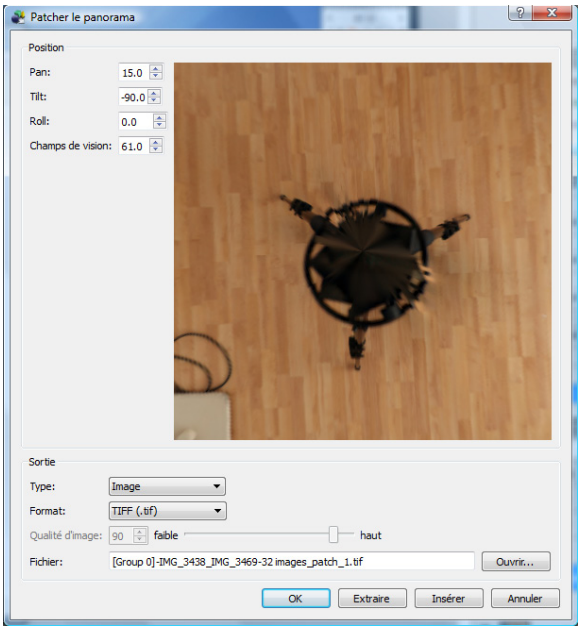
If it is necessary to remove also the tripod and the x-motor from the image and get a perfectly clean nadir, it is possible to patch it with a modified image using the software Pano2VR as follows.

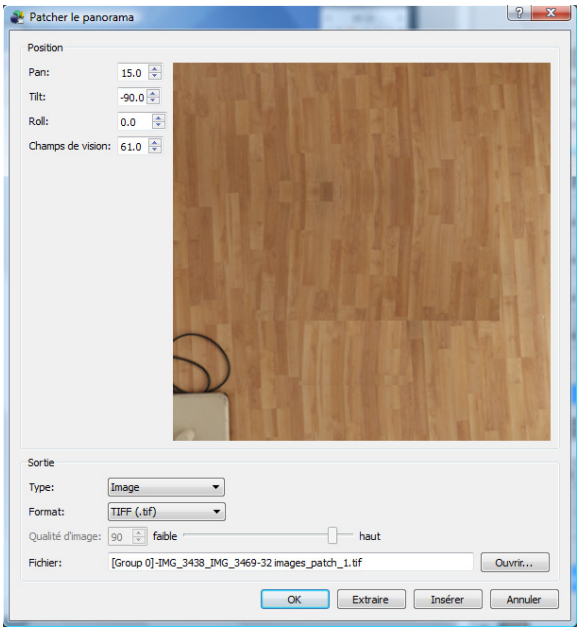
Open **Pano2VR** and load the panoramic image in tiff or jpeg. Then click on **Patch Input** to add a new patch to the nadir area. Click on **add.**





A new window with a spherical viewer will be opened. Pan tilt the image until you can see only the area necessary for nadir editing. Then click on **extract.** The visible image is then saved on the disk. Open this image and edit it in Photoshop (or similar) then load the patch by clicking on **insert.** The image is now corrected and can be exported again into a tiff file.





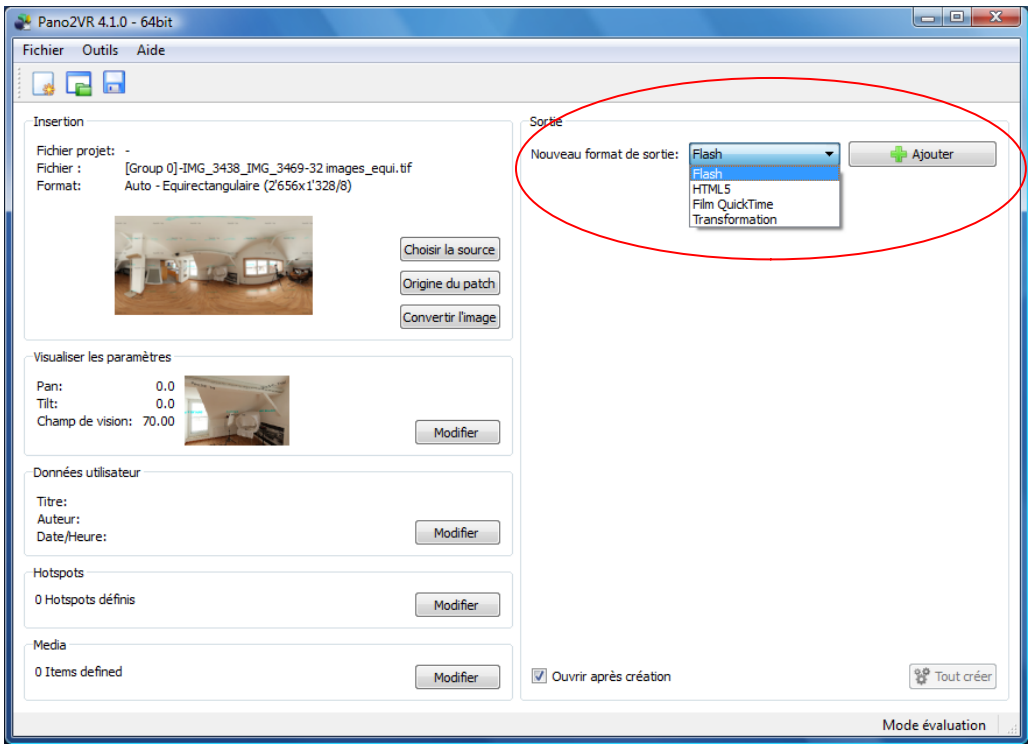
5.5 Conversion to web formats

After stitching the image out of the VR Drive, the resulting panorama is a tiff or jpeg image displayed using the selected projection model.

The next step is in general to display this image on a local or online viewer. To achieve this the image needs to be converted either into flash, into html5, in QTVR or other web compatible formats.

This conversion can be done very simply using for example Pano2VR.

Load the panorama and select the conversion type. Render the new image and add it to your website.



5.6 Speed vs. quality mode

In **“quality” mode** the VR Drive stops and releases the camera in every position.
In **“speed” mode** the VR Drive releases the camera “on the fly” without stopping in every position.

“quality” mode:
stop + release

“speed” mode:
non-stop release

The faster the total rotation time, the faster the shutter speed of the camera needs to be, otherwise the images will be blurred (unsharp).

The following table indicates the maximum shutter speed required for different rotation times. For example, when setting the rotation time to 6 seconds, **the camera shutter speed needs to be 1/1500 sec. or faster (1/2000 s, 1/3000 s, …):**

Rotation time (X, 360°)	Shutter speed
6 s	1/1500 s (or faster)
10 s	1/900 s (or faster)
20 s	1/450 s (or faster)

These values are just average and might change with the camera and the lens. For this reason the VR Drive indicates for each program and rotation speed the maximum shutter speed to be used to get sharp images.

When a fast shutter speed cannot be reached (i.e. under difficult lighting conditions), it is possible to compensate in the following way:

- Increase ISO/ASA
- Open the aperture (use a lower f-stop) and save the image at a larger resolution – the lower depth of field can be compensated by compressing the resolution of the images
- Reduce the rotation speed

5.7 Gigapixel photography

When generating gigapixel panoramas, both hardware and software components of the workflow are used to their limits. Any error can lead to a non correctable stitching mismatch and, in the worst case, the images need to be retaken.

To avoid such inconvenience please follow our recommendations both for hardware and software specific to gigapixel photography:

Lens and camera mounting

In gigapixel photography it is quite common to use heavy tele-lenses. These are some recommendations for mounting the camera and lens on the VR Drive:

- The maximum weight that can be mounted on the VR Drive is 20 kg. Please make sure your material does not exceed this limit as this might damage the system.

- When the size of the camera + lens exceeds the size of the L-bracket of VR Drive, it is very important to **switch on the VR Drive before attaching the camera** and **never create a program capturing images close to the nadir or the zenith**. This might damage either the lens, the camera, the VR Drive or all of them.

- It is of course necessary to set the camera and lens in the correct nodal point. However, when using long and heavy lenses, it is also important to **balance the weight** according to the centre of rotation. So whenever possible, **attach the L-Bracket to the lens directly** as shown in the image below

5.7 Gigapixel photography (continued)

Software mode: quality vs. speed

As the number of images to be captured can be extremely high, the overall capture time might also be an issue. To minimise capture time follow these recommendations:

Whenever the light conditions are sufficient, it is highly recommended to use **speed mode** in gigapixel photography. This has two main advantages compared to quality mode:
- **No vibrations** due to motor start/stop
- Significant **capture time reduction**

If the light conditions do not allow the use of speed mode, it is necessary to use **quality mode**. In this case please make sure to program a **pause before every image** to avoid getting unsharp images due to vibrations.

Make sure to use a **fast memory card** and adapt the rotation speed or the pause after image in the VR Drive accordingly.

USB settings

As the capture time might be very high, it is important to make few verifications before starting a gigapixel program. These verifications can be done automatically by the VR Drive if the camera is compatible with the VR Drive USB connection (please check the compatibility of your camera on our website).

We recommend to use the following USB settings on your VR Drive:

- Set the **“check white balance”** to **on**. The VR Drive displays a warning if the “automatic white balance” is active on the camera. This avoids color mismatch on the final panoramic image

- Set the **“release control”** to **on**. The VR Drive will make sure that every image is released. If not the following warning message will be displayed: “cannot reach exposure time”. In this case it is necessary to reduce the rotation speed of the VR Drive or to use a faster memory card

- Activate the **“memory check”** to avoid losing images when the memory card id full. Select one of these two options:
  - **Stop if full**: the program is stopped when the memory card is full
  - **Check at start**: the VR Drive computes the necessary memory for all images in a program. When starting a program it displays a warning if there is not enough space remaining in the memory card

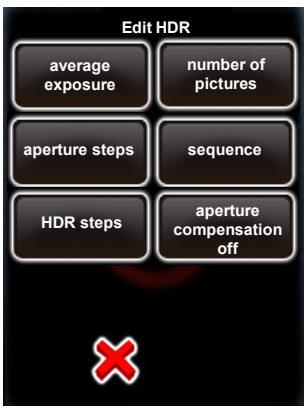
For cameras that are not compatible with the USB connection on the VR Drive, please verify these settings manually before starting a gigapixel program.

5.8 HDR photography

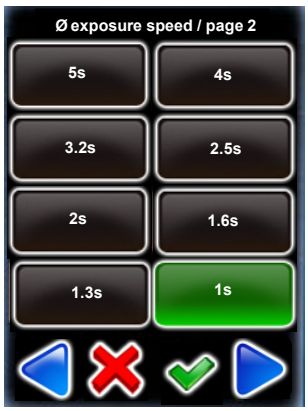
The bracketing of the camera in “quality mode” is limited to +/- 2 EVs (f-stops). For 32-bit HDR photography this is insufficient. With the VR Drive “HDR mode” it is possible to eliminate this limitation. In the “HDR mode” the VR Drive controls the camera software directly, allowing much larger bracketing steps and a larger dynamic range.

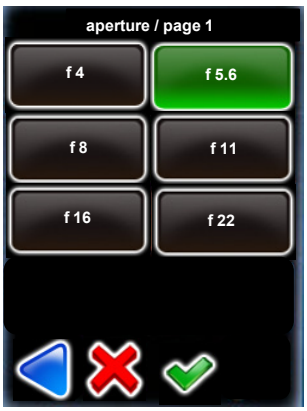
On top of that, every HDR sequence is unique and strongly depends on the light range and its distribution in the image. It is therefore extremely useful to use the VR Drive for a fast and easy editing of the HDR sequence parameters. It is possible to change:

- The average exposure time
- The number of bracketed images
- The aperture steps between 2 images
- …



HDR steps / page 1
exp.: 2s aperture: f8 ISO/ASA: 100
exp.: 1/4s aperture: f8 ISO/ASA:100
exp.: 1/30s aperture: f8 ISO/ASA: 100
exp.: 1/250s aperture: f8 ISO/ASA: 100
exp.: 1/2000s aperture: f8 ISO/ASA: 100





In case the exposure range of the camera is not sufficient to cover the desired bracketing steps – because the number of images or the bracketing steps are too large – the VR Drive will display the HDR table in the following way:

HDR steps / page 1
exp.: 2.5s aperture: f8 ISO/ASA: 100
exp.: 1/6s aperture: f8 ISO/ASA:100
exp.: 1/100s aperture: f8 ISO/ASA: 100
exp.: 1/1600s aperture: f8 ISO/ASA: 100
exp.: aperture: f8 ISO/ASA: 100

In this example, the **average exposure** was set to **1/100s**, the **number of images to 5** and the **aperture steps to 4 f-stops**.

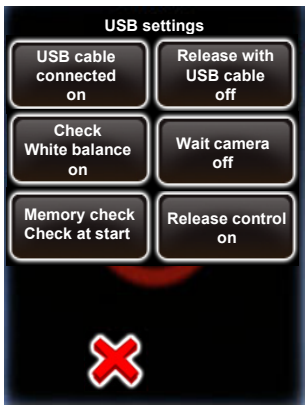
As a result, the fastest exposure goes beyond the possibilities of the camera (theoretical exposure speed: 1/25600s, limit: 1/8000s).

Click on the red HDR step to **edit** it or change the number of pictures or the aperture steps.

5.8 HDR photography (continued)

Some parameters of the camera might generate problems during the image capture or stitching in HDR mode. It is therefore necessary to make some verifications before starting an HDR program. These verifications can be done automatically by the VR Drive, and can be activated in the **USB settings** menu

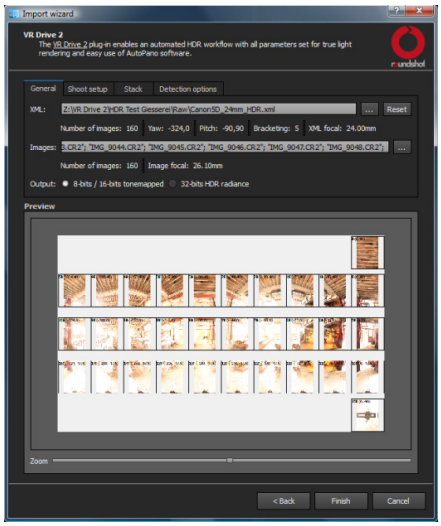
We recommend to set the following USB settings on your VR Drive:



- Set the **"Release with USB cable"** to **on**. The VR Drive will use only the USB cable for camera control and for image release. This allows to disconnect completely the release cable

- Set the **"check white balance"** to **on**. The VR Drive displays a warning if the "automatic white balance" is active on the camera. This avoids a color mismatch between images

- Activate the **"memory check"** to avoid losing images when the memory card id full. Select one of these 2 options:
  - **Stop if full**: the program is stopped when the memory card is full
  - **Check at start**: the VR Drive computes the necessary memory for all images in a program. When starting a program it displays a warning if there is not enough space remaining in the memory card



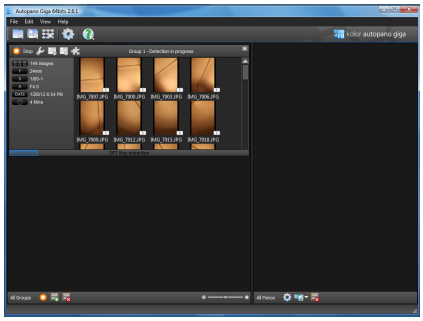
The final step in creating a 32-bit HDR panorama is the stitching. We highly recommend to use the **AutopanoGiga VR Drive plug-in and the xml file.**

The HDR panorama can be generated in 3 clicks:

- Import the images and the XML file in the VR Drive plug-in

- Select the bit depth of the output image:
  - 16bits for direct tone mapped images
  - 32bit for real HDR output

- Start the stitching process.



The major advantage of this software is to be able to :

- Stitch only the average exposure layer and apply the stitching model to all other layers. This means perfect layers alignment

- Combine the already stitched layers into a 32bit HDR panorama avoiding ghosting effects

5.9 Turntable and object movie generation

Creating an object movie using the VR Drive for capturing the images is very simple and allows perfect positioning of the object. The system is totally automated from object rotation to image capture, which allows to optimise all parameters of the object movie. You can find below some recommendations for setting-up your system in turntable mode and for compiling the images into an object video.

Hardware Setup

The hardware setup in turntable mode is very different from the other modes as the camera is not attached to the VR Drive. These are few recommendations when setting up your system:

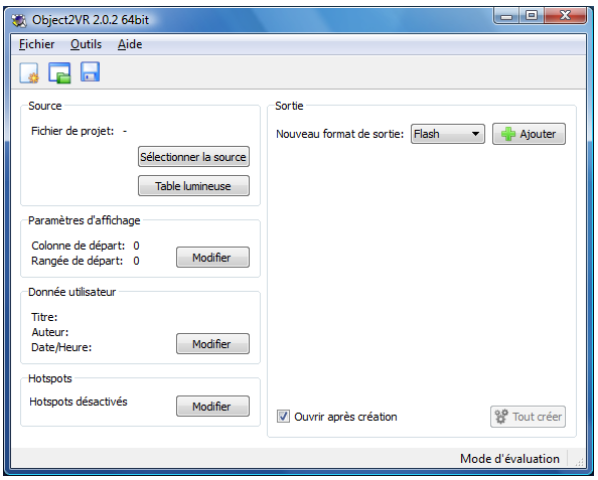
- Make sure to **rotate the VR Drive X-motor upside-down**. This prevents the cables from any damage as the turntable will be the only rotating element in this configuration
- Make sure that the object is **not exceeding 20 kg** and place it in the **center of the turntable**
- Place the system in a **light controlled environment** (studio). this will avoid color mismatch in the final object movie
- Use an **all white background** around the object. It is for example recommended to **cover the turntable with a white reflective material**. This will help to batch process the object extraction on every image

Object movie generation workflow

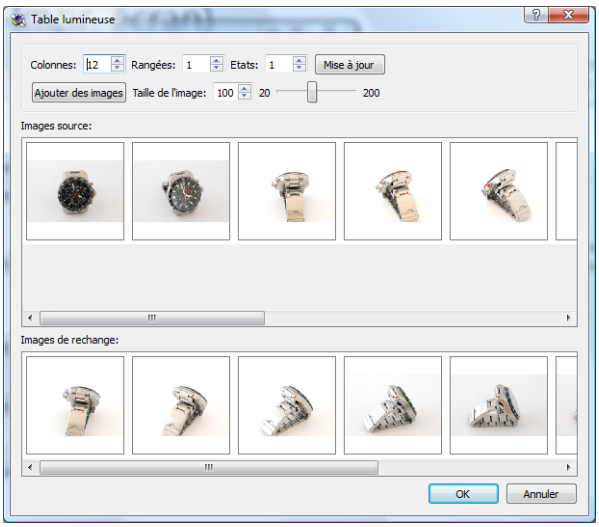
- The first step in the object movie creation is to process the images for getting a perfect representation of the object. If the light conditions and the background are correctly set, it is possible to **batch process the image adjustment** in Photoshop to gain speed and consistency.

5.9 Turntable and object movie generation (continued)

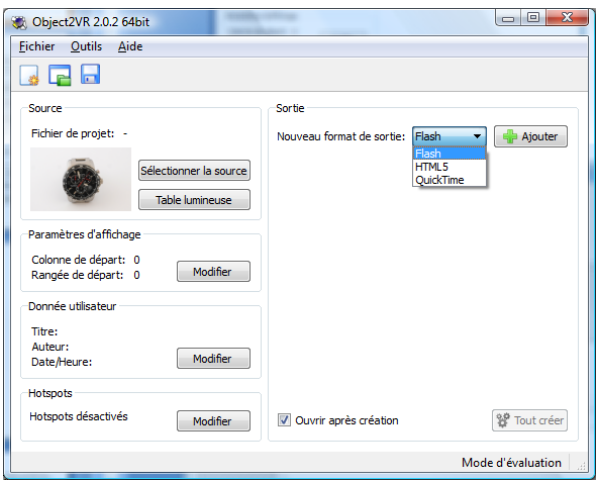
Object movie generation workflow (continued)



- Open the object movie software of your choice. In this example we used Object2VR software.
- Click on **Light table** to import the image sequence captured with the VR Drive



- Set the resolution and the image sequence of the object movie. By default the image sequence should be correct.



- Export the object movie in flash, html5 or QuickTime format.

5.10 Using long exposure times

When using long exposure times on your camera in quality, HDR, turntable or timelapse modes, it is very important to make sure that the image is captured and saved before the VR Drive is moving to the next position.

Here we need to differentiate between camera release with release cable or with USB cable:

Using the release cable

When using the release cable only, the VR Drive has no information about the camera parameters including the exposure time. Therefore the **pause after** parameter needs to be adjusted according to the exposure time defined on the camera.

For example if the exposure time of the camera is 20s, it is recommended to set the **pause after to 22s.** The 20s of the exposure time plus 1 or 2 seconds for safety.

In some cameras it is possible to switch on the **Noise reduction** option for long exposure times. If the exposure time of the camera is 20s, the image capture will in reality take about 40s. In this case the **pause after needs to be set to at least 42s.**

When using the release cable it is possible to use any exposure time on your camera.

Using the USB cable

When using the USB cable with compatible cameras, the VR Drive has access to the exposure settings of the camera. It is therefore not necessary to set any **pause after** as long as the following **USB settings** are defined.

- Set the **"USB cable connected"** to on
- Set the **"Release with USB cable"** to on. The VR Drive will use the USB cable for releasing the camera instead of the release cable
- Set the **"Wait camera"** to on. The VR Drive will read the exposure time used in the camera and wait for the image capture duration before moving to the next position.

Unfortunately the **noise reduction** option is not readable by the VR Drive. It is therefore not possible to use this option when releasing the camera with USB cable only. It is then necessary to **use the release cable**

5.11 Using the VR Drive light meter

One of the most critical parameter when using the VR Drive is the camera exposure. Usually it is set manually on the camera, but it is also possible to use the **VR Drive light meter for a fully automatic process.**

The VR Drive light meter is able to measure the light before starting the image taking. Then, according to the selected strategy and options, the VR Drive will set the correct exposure time, ISO/ASA and aperture on the camera. The image taking process will then start automatically.

This way there is no need to adjust manually the exposure on the camera or change the HDR reference exposure time before every project.

With the VR Drive light meter sensor it is necessary to use a camera compatible with VR Drive USB control. Please make sure your camera is marked as compatible in the camera compatibility list on our website.

The automatic exposure function is only available in quality and HDR modes. Speed mode is not compatible with this functionality because in this mode the images are triggered with the standard release cable rather than USB.

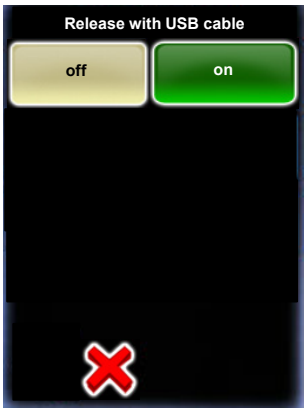
Hardware Setup

- Connect the camera and the VR Drive with a USB cable.
- Set your camera in **Manual** mode. The VR Drive will set all exposure, ISO and aperture parameters using the USB connection
- Connect the light meter sensor on the VR Drive antenna socket. And fix the 2 corresponding screws

5.11 Using the VR Drive light meter (continued)

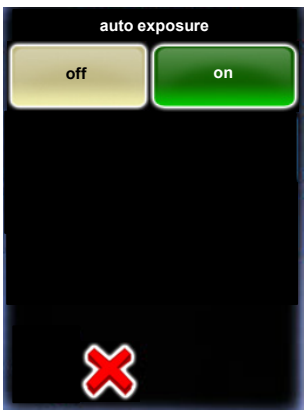
Software Setup

When creating a new quality or HDR program you can follow the wizard as before. Please find below the key parameters to be set when using the light meter:



Set the "**release with USB cable"** to **on.**

It is possible to leave this parameter to off but in this case, it will be necessary to connect the USB and the release cable on the camera

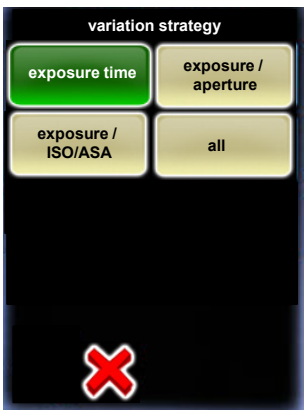


Set the "**auto exposure"** to **on.**

This function is only available if the light meter is connected to the VR Drive and can be detected.

The light will be measured at the beginning of a program and the chosen parameters (exposure, ISO and aperture) will be used for all the images of the program.

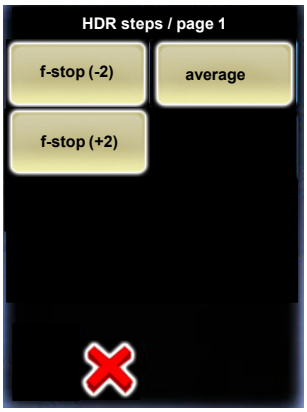
Please make sure to **position the light meter in front of an average light area**. Avoid placing it in front of a strong light source or the sunlight to avoid under exposed images



Define the **"variation strategy"** to be used to define the best parameters on the camera and get a correct image exposure:

- **Exposure:** only the exposure time will change according to light. The wizard will ask to define the ISO/ASA and aperture in the next step.
- **Exposure/aperture:** both exposure and aperture can be changed by the VR Drive according to light. The wizard will ask to define the ISO/ASA in the next step.
- **Exposure/ISO:** both exposure and ISO/ASA can be changed by the VR Drive according to light. The wizard will ask to define the aperture in the next step.
- **All:** The VR Drive will automatically select all parameters according to light

5.11 Using the VR Drive light meter (continued)



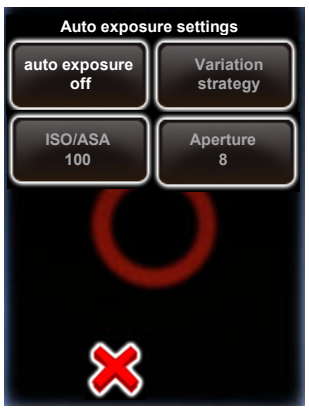
In HDR mode, after setting the exposure strategy and the corresponding parameters manually, the VR Drive shows the HDR sequence without definite exposure values.

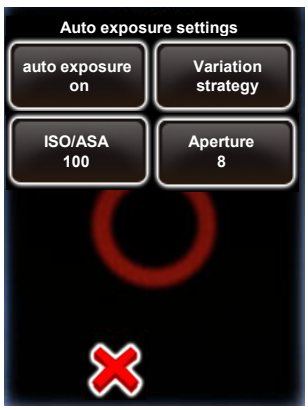
In this example 3 bracketed images will be taken: Average exposure time, +2 f-stops and -2 f-stops.

The definite exposure values are not displayed as they will be adapted according to the light meter measure when starting a program.

When editing an existing quality or HDR program it is possible to activate the auto exposure function and adjust the strategy parameters:

In edit menu, click on **"auto exposure settings"** to access the automatic exposure settings menu of the VR Drive.



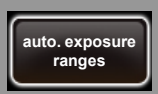


Click on **"auto exposure"** to activate the automatic exposure functionality with light meter sensor.

Then set the following parameters:

- Variation strategy
- ISO/ASA when this is to be defined manually
- Aperture when this is to be defined manually

Many parameters, such as camera performance or light conditions, can influence image quality. Moreover, some projects might have duration or speed limitations. It is therefore possible to set absolute maximum and minimum values for the 3 auto exposure parameters.



In the "Settings"-> "General" menu click on **auto exposure ranges**

It is possible to define the maximum and the minimum value for the following parameters: ISO, Aperture and Exposure

This prevents the VR Drive from selecting extreme values to adjust the camera to the current light.

The VR Drive will never select values outside the defined range. A warning will be displayed if the light condition leads to out of range combinations.

5.12 Video vs. timelapse mode (continued)

“Video” and **“timelapse”** modes, are used to move the camera smoothly through a custom path to generate an animated movie.

The main differences between these 2 modes are the following:

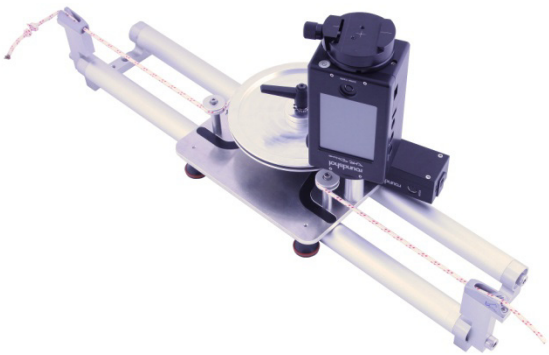
- In **“timelapse”** mode the VR Drive is used to release the camera and take pictures every ... seconds or degrees. The images will later be compiled together and accelerated to get a timelapse movie.
- In **“Video”** mode the VR Drive is used as a pure motorised arm. No image is captured and the camera needs to be set to capture a video.

For both modes the camera can be used in automatic focus and exposure time.

Several hardware options are compatible with both modes:

360°: this is the basic VR Drive functionality. A second L-bracket is used so that the camera can be mounted in landscape format.

Dolly: The VR Drive x- and y-motors are mounted on a dolly structure. The y-motor is used to move the dolly forward and the x-motor is either used to change dolly direction or to rotate the camera.



Linear rail: The VR Drive x- and y-motors are mounted on a linear rail structure. The y-motor is used to move along the rail and the x-motor is used to rotate the camera.

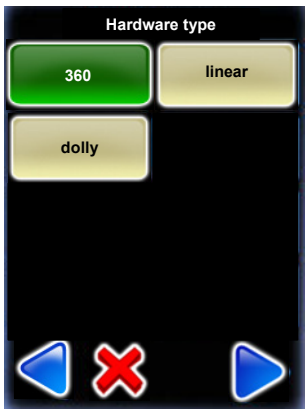
The rotation according to the nodal point is not necessary as no stitching is required on the final images. The camera is positioned freely to deliver the required video or timelapse sweep.

5.12 Video vs. timelapse mode (continued)

The main advantages of using the VR Drive to generate timelapse or video sequences are:

- 360°x180° full spherical field of view
- **Fully automated** process thanks to horizontal and vertical motors
- **System flexibility** with several hardware options allowing several camera motion types
- Very **smooth and precise** movements for a very wide speed range from **very fast to very slow motion**
- Very strong motors capable of handling **equipment up to 20 kg**
- All sequences can be **pre-programmed and edited very** efficiently using the embedded VR Drive software
- The sequence can also be **repeated** as many time as necessary to get the perfect result
- Every sequence can contain **many intermediate points** where specific **duration, acceleration, pause and image release frequency** can be defined as described below

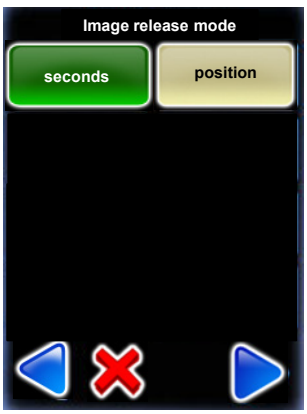
When creating a new video or time lapse program you will be guided by the wizard to define the sequence to capture:



After defining the camera and lens information, select the hardware type to be used.

Choose between:

- **360°:** Regular VR Drive with additional L-Bracket
- **Linear:** VR Drive mounted on a linear rail
- **Dolly:** VR Drive mounted on a dolly

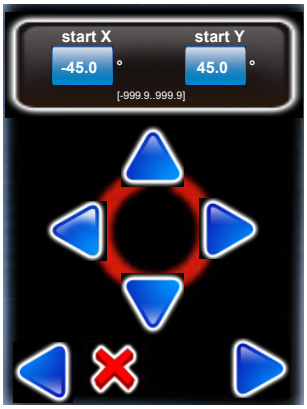


In case of **timelapse** program, select between 2 **image release modes**:

- **Seconds:** images will be released according to a time interval
- **Position:** images will be released according to a distance or angle interval

It will then be necessary to define the **pause before and after** every image

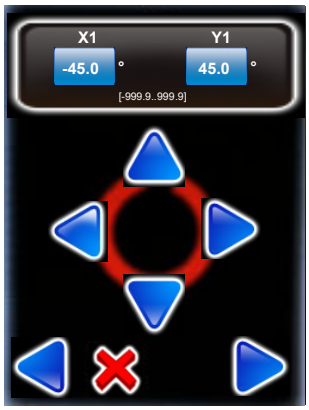
5.12 Video vs. timelapse mode (continued)



Now the definition of the video or timelapse sequence can start.
Set the **start point** of the sequence

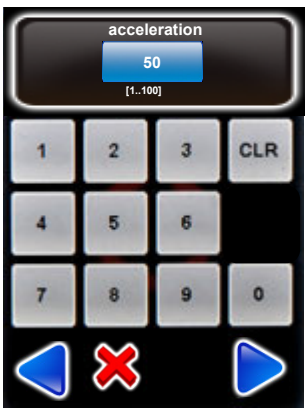
Use the arrow keys to Move the VR Drive **right/left/up/down**.

When the start position is reached confirm with "**next**".



Define the next point in the sequence using the arrow keys or enter the angle directly in the X and Y fields

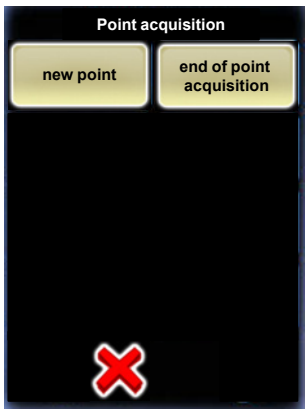
Confirm the point with **"next"**.



For every acquired point indicate the following:

- **Image every ? degree:** time or position (degree or cm) interval for releasing the images (Only applicable in timelapse mode)
- **Acceleration:** degree of speed adaptation from previous to the current point (1% slow, 100% fast)
- **Duration:** time (in seconds) from previous to the current point (including all pause before or after image if any)
- **Pause:** time (in seconds) of pause on the current point before starting the next sequence step

5.12 Video vs. timelapse mode (continued)



At this stage the sequence from starting point to point 1 is defined.

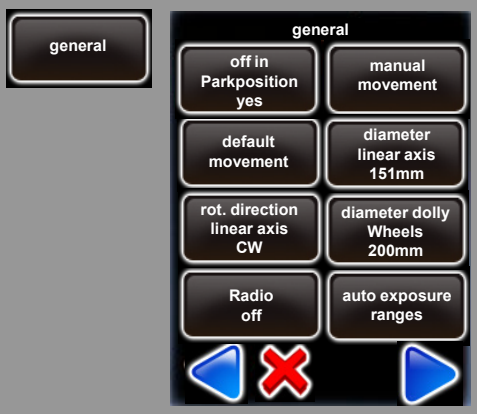
Click on **new point** to define the next sequence point. As for the point 1 define the position, image interval (if applicable), acceleration, duration and pause.

Repeat this process until the video or timelapse sweep sequence is fully defined.

Click on **end of point acquisition** to finish the timelapse or video program. You can now start the program and edit any value if necessary.

Please note that the point creation is the same for all hardware types. The only difference is the point position values. They can either be defined in degrees or in cm depending on the configuration.

The VR Drive is delivered with the correct parameters for your hardware configuration. However if the dolly or linear rail are ordered later, it is possible to adjust their dimensions on the VR Drive.



In the “Settings”-> “General” menu edit one of the following parameters:

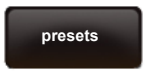
- **Diameter linear axis:** to change the size of the wheel used on your linear axis. Contact Seitz to get the correct size for your hardware configuration
- **Rot direction linear axis:** to define the positive rotation direction of the main wheel of the linear axis. Choose between CW or CCW
- **Diameter dolly wheels**: to change the size of the wheels used on your dolly. Contact Seitz to get the correct size for your hardware configuration

5.13 Working with presets

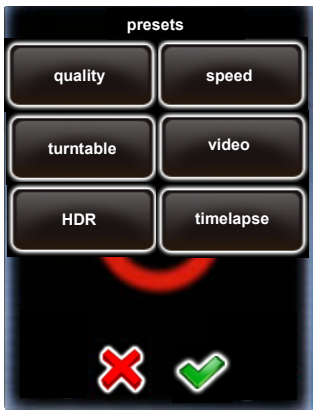
The VR Drive has a default value (preset) for every parameter of every mode. When creating a new program these values are always suggested by default, and needs to be adapted each time to the hardware setting currently used.

This behaviour can be optimised by changing these preset values and make them match with the camera, lens and software parameters most often used.

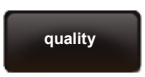
For example, when always using the same camera, it is more efficient to set the corresponding **A-value** to a preset. This way, this value will always be automatically loaded every time a new program is created.



Click on **"presets"** to define the parameter preferences of your VR Drive.



The "presets" are grouped by software mode:
- "quality"
- "speed"
- "turntable"
- "video"
- "HDR"
- "timelapse"



Click on **"quality", "speed", "turntable", "video" or "HDR"** to set up the presets.

Click on the preset to modify, for example the A-value:

By setting presets the regular program creation will be optimized without reducing the VR Drive flexibility. Even if the default value will corresponds to your most used setup, it is still possible to edit all parameters either during new program creation with the wizard or in the edit menu .

5.14 Frequently asked questions

Q: What are the ideal camera settings and accessories?

A: Ideal settings: manual exposure, manual focus, white balance set to a fixed value. Accessories: additional spirit level in the viewfinder shoe for levelling, fast CF storage card (especially for “speed” mode), fixed white balance.

Q: I have a VR Drive “full” but the vertical motor does not respond. What can I do?

A: Please check if the cables are correctly plugged and if the vertical motor is activated in the software (settings/general/”has y motor: yes”).

Q: How can I connect the radio release unit?

A: Insert the radio release unit into the radio socket on the VR Drive.
Activate the radio release signal in the VR Drive software (settings/general/radio on).

Q: The performance of the VR Drive battery is less than expected. What is the problem?

A: When the radio release unit is connected and the function “remote radio” is set to “on”, the radio receiver will continously consume battery even if the VR Drive is turned off. To save energy, turn “remote radio” to “off”.

Q: Every time the VR Drive is switched on all parameters are lost (date, time ...). What is the problem?

A: This means the internal support battery of the VR Drive is empty. This can happen When the radio release unit is connected and the function “remote radio” is set to “on” for a long period. It is then necessary to open the VR Drive using the 4 front screws and replace the support battery. This is a standard 3V round and flat battery with the following reference: CR2032 (3V). It can be easily identified when opening the VR Drive.

Q: How do I find the nodal point? Is there a database for nodal points for my camera/lens?

A: There is a simple procedure to set the nodal point for every camera/lens combination. Please follow the instructions in section 5.1. Due to the virtually unlimited combination possibilities of cameras, lenses, focal lengths and focusing distances, it is not possible to provide a database of nodal points.

5.14 Frequently asked questions (continued)

Q: How can I load a camera into the list of "my cameras" (favourites) that is currently not included in the factory database?

A: Go to settings/database/my cameras.
Load any new camera from the database into the "my cameras" list.
Click on the new camera, edit the camera.
Overwrite the parameters: camera, type, X (mm), Y (mm).
For more information please read chapter 4.5.2 settings (database/my cameras).

Please contact us by email at seitz@roundshot.ch to report the new camera. We will then include it in the camera database and provide the updated file (.csv) as a download in the "Club VR Drive". It is then possible to update the factory list of cameras by a software update.

Q: Can I replace the batteries of my VR Drive?

A: This is generally possible but not necessary.
The VR Drive contains 4 powerful Li-Ion batteries that can be recharged using the supplied universal charger.

Q: My VR Drive y-motor places the nodal rail in the wrong parking position (for example 63° instead of 90° with camera looking up). What can I do?

A: It is possible to mechanically adjust the parking position by opening the screw inside the y-motor rotation axis with the small allen key. Please follow the instructions in section 2.1.4 "special hardware assembly options".

Q: How can I update the software of my VR Drive?

A: Connect to the roundshot website at www.roundshot.ch, log in at the "Club", go to "Club VR Drive", download the latest VR Drive software and camera database file. Unzip these files and load them on the Roundshot USB stick supplied with the VR Drive. Follow the instructions in section 6.5. If you do not have a "Club" access, please contact us at seitz@roundshot.ch indicating the hardware ID of your VR Drive as well as where you bought the equipment. We will activate your membership and confirm your "Club" registration by email.

Q: The software update won't load on my VR Drive. What is wrong?

A: Make sure to unzip the software update zip file after downloading it from the "Club". Load the directory "MTP_Cameras" and the .csv file and .vrd file to the Roundshot USB stick. Do not use other USB sticks as their compatibility is not guaranteed. Turn off the VR Drive. Insert the USB stick. Turn the VR Drive on while keeping the on/off button pressed several seconds until the green firmware update progress bar is displayed.

5.14 Frequently asked questions (continued)

Q: Can I upgrade my VR Drive with new software modes?

A: Yes, you can. Purchase the additional software mode(s) through your distributor or directly via the Roundshot e-shop. We will then send you a new software key to activate the new mode(s). Please follow the instructions in section 6.6

Q: Can I try out a new VR Drive mode before purchasing it?

A: Yes, you can. Please ask for a temporary VR Drive activation key for a certain software mode. All software modes that are already purchased are activated permanently, while the ones in demo mode have a limited duration (typically 30 days).

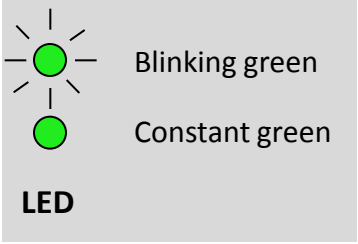
6. Maintenance & Warranty

6.1 Recharging the VR Drive

The VR Drive is powered by **4 long-lasting rechargeable Li-Ion batteries**. The battery status is indicated permanently on the display.

Recharge it with the universal speed charger supplied with the VR Drive. Connect the charger to a power source (110-220V) and plug the cable into the socket for the charger cable marked with a **"flash"** sign.

The normal recharge time is **6-7 hours** (green blinking LED). As soon as the charging process is complete, the LED changes to constant green.



6.2 Transport & storage

When transporting the VR Drive from one location to the next, either **disassemble** the unit and use a bag for transport or make sure to **turn off** the VR Drive into **parking position -90° or +90°.**

When turned off no damage can be done to motor and gears.

Avoid moving the VR bracket and nodal rail by hand as this may damage the motors and gears.

If the VR Drive is not used for a longer period of time, use the **shipping box** to store it in a dry and cool place.

The Li-Ion batteries do not have to be drained – they have no memory effect.

6.3 Touch screen calibration

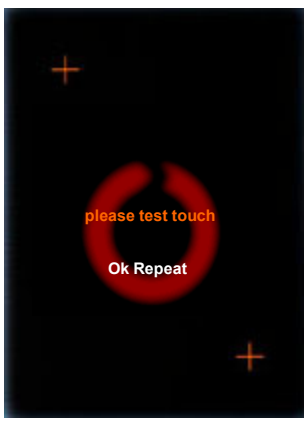
When the touch screen positioning becomes less precise, it is possible to calibrate it.

After start-up of the VR Drive, **double click anywhere on the touch screen**.

For maximum precision use a sharp item such as a pen.

Click on the **top/left** cross.

Now click on the **bottom/right** cross.



Click anywhere on the screen.

Check the touch precision (cross).

If OK, confirm with **“OK”.**
If not, repeat the test by clicking **“repeat”.**

After **“OK”** the VR Drive will start-up with the **“home”** menu.

6.4 International Warranty

Your Roundshot VR Drive is covered by the international 2-year Seitz warranty. The warranty is linked to the hardware ID (serial number) and is stored in our database.

If there is any malfunction or defect of the equipment we will repair the VR Drive at no cost. The warranty extends to technical defaults that are not caused by careless use, damage by transportation or other defaults not related to the manufacturing of the equipment.

We invite you to register your product with us. Registering your product has several advantages:

- Free access to the latest software downloads and instruction manuals
- Email software update alerts + release notes
- Direct technical assistance in case of a problem

Registering your product is a simple 2-step process:

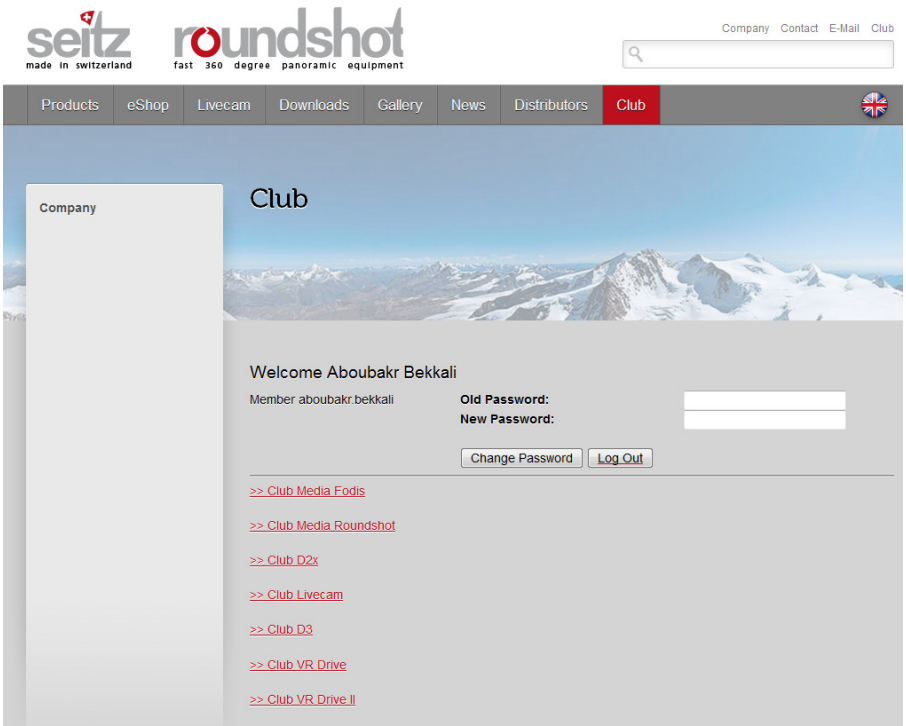
1. Send us an email to club@roundshot.com indicating the hardware ID of your VR Drive as well as where you bought the equipment.

2. We will activate your membership and confirm your “Club” registration by email.

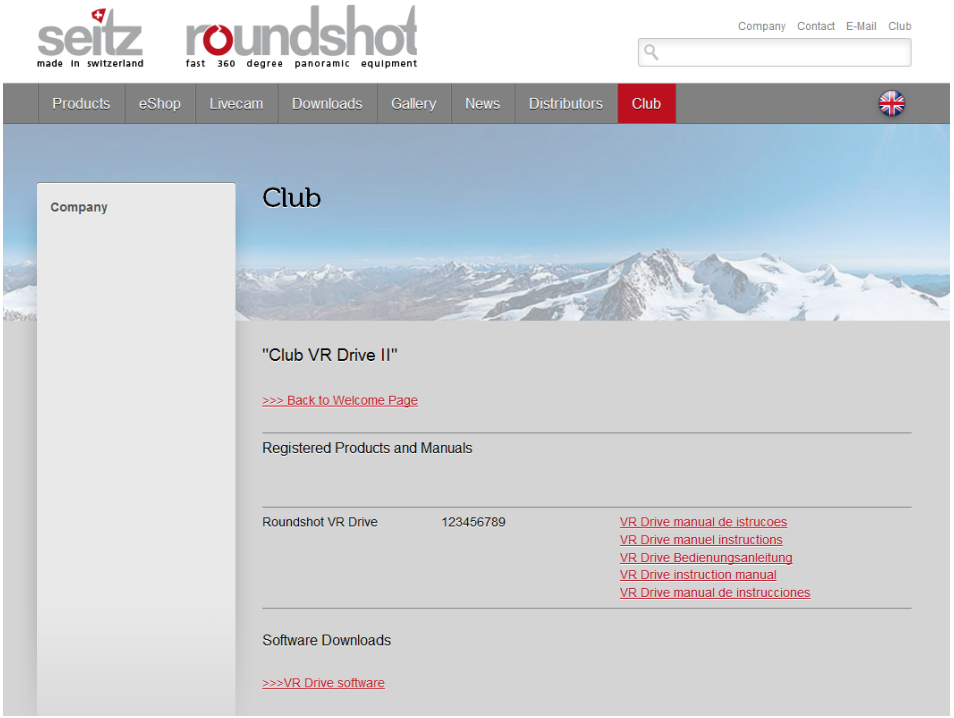
6.5 Software update: “Club VR Drive”

Connect to the “Club” website at www.roundshot.ch.

Please change your password on your first visit.



The **“Club VR Drive”** contains your registered product(s), the **latest instruction manuals** as well as the **up-to-date VR Drive software for download**.

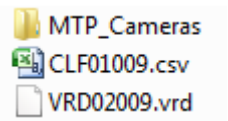


6.5 Software update: “Club VR Drive” (continued)

Download the latest VR Drive software from the “Club VR Drive” website.

Important: unzip the zipped folder.

The software download consists of one directory and two files:



The directory **MTP_Cameras** includes the parameters required for USB communication between VR Drive and camera, i.e. for HDR mode.

The .csv file contains the **camera database**. As camera brands/models are in continuous evolution, we update the camera database regularly.

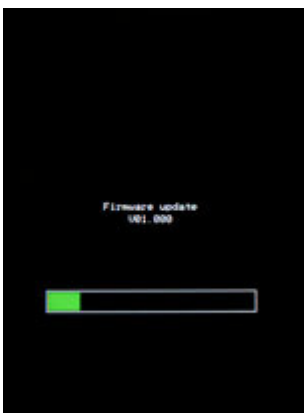
The .vrd file contains the **VR Drive software**. This software will also be updated to include new features and enhanced usability.

Load the directory and the two files on a USB data stick.

Important: Due to driver incompatibilities, not all USB data sticks can be used for updating the VR Drive.

For security, we supply a Roundshot USB data stick (capacity: 2 GB) with your VR Drive.

We recommend that you use the original (and tested) Roundshot USB stick and keep it with your VR Drive at all times.



Turn the VR Drive off by pressing the on/off button during several seconds. The screen will go black.

Insert the Roundshot USB key into the USB drive.

Start up the VR Drive by pressing the on/off button during several seconds until the green Firmware Update progress bar appears.

6.5 Software update: “Club VR Drive” (continued)

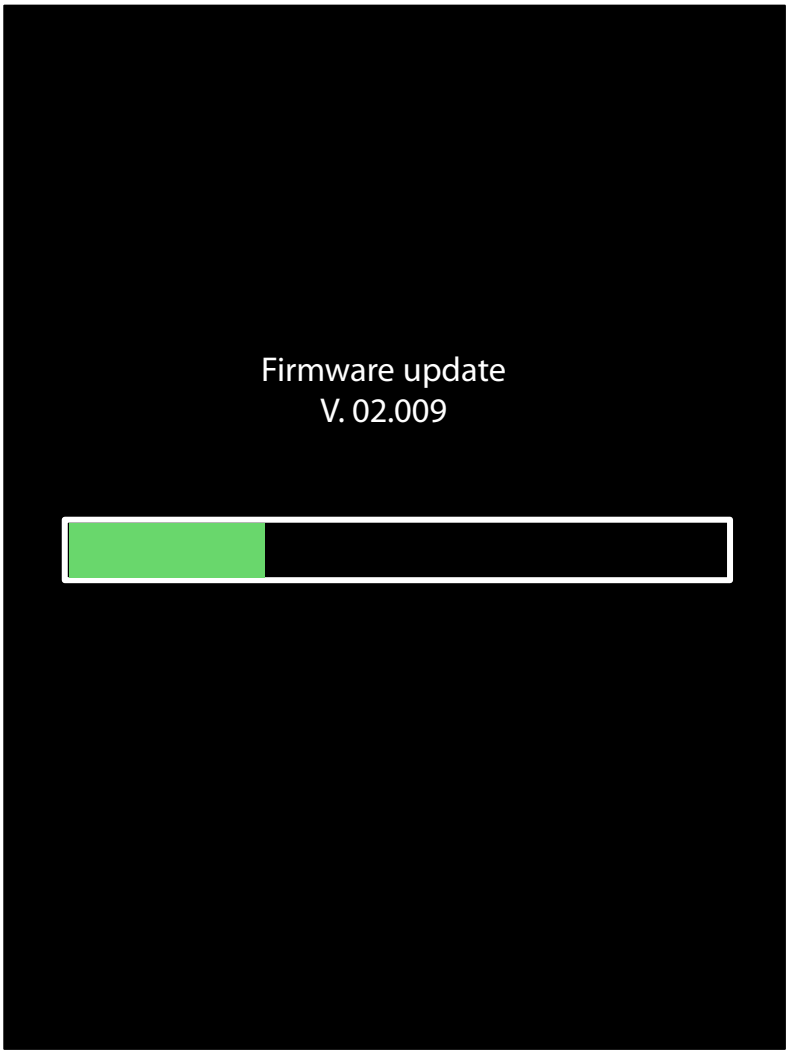
On/off button

Press several seconds

Keep the VR Drive on/off button **pressed.**

Keep it pressed.

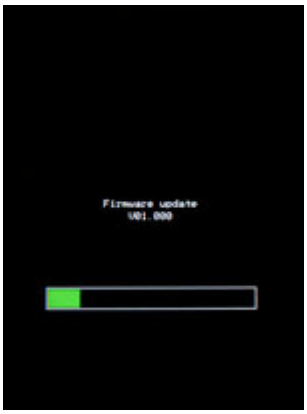
Keep it pressed until the green Firmware update progress bar is displayed:



6.5 Software update: “Club VR Drive” (continued)

The VR Drive will now load the new software from the USB key.

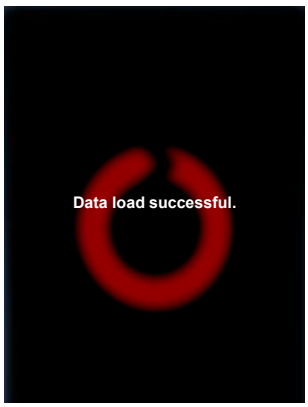
This is confirmed with the status: **“Firmware update / v xx.xxx”.**

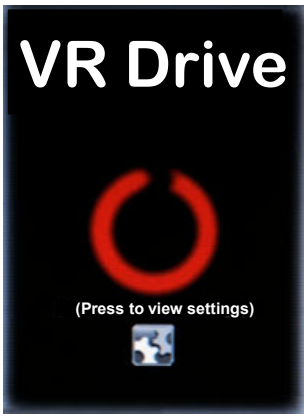


- Please wait until the camera database is fully loaded before unplugging the USB key
- Removing the USB before may lead to an incompatibility between VR Drive software and camera database

Once the software update is complete, the VR Drive will also **update the camera database** if the update file is also loaded on the USB key.

This process is confirmed with the message **“camera data are being loaded”.**





As soon as the camera database upload is finished, the VR Drive will go into normal **start-up mode**.

This is confirmed with the **start-up screen**.

The software updates are now complete.

All previous programs and settings remain intact.

It is now safe to remove the USB stick.

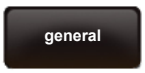
6.6 Upgrades: Adding new software modes

Software upgrades can be ordered after initial purchase of your VR Drive.

They can be ordered from your distributor or directly from Seitz Roundshot on our website www.roundshot.ch.

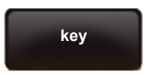
Once your purchase is confirmed, we will send you a **16-digit key** which is linked to the unique hardware ID (serial number) of your VR Drive. This key activates the software modes.

Click on **“settings”** to access the VR Drive settings menu.



Click on **“general”.**

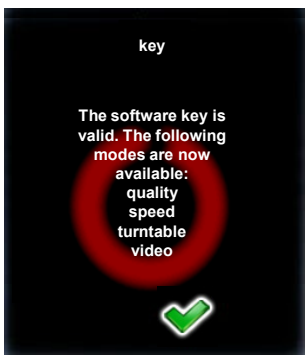
Click on **“software”**.



Click on **“key”** to display the software key.

Enter the new software key.

Confirm with **“OK”.**



After entering a valid key, the software displays **the available software modes.**

When entering an invalid key, the last valid key will be loaded.

Confirm with **“OK”.**

To try out a new software mode, request a temporary software key by Roundshot. It will be valid for a limited time (30 days, 60 days…) and allows non-restricted use of all software functions.

6.7 Return of equipment / recycling

Your Roundshot product and the accessories are produced from highest quality materials and parts and will provide you continued pleasure. Should you nevertheless want to dispose of your Roundshot equipment one day, it should not be placed in normal waste. The correct disposal of your old equipment is a contribution to preventing possible negative causes for the environment.

For optimum recycling we kindly ask you to return us your camera (with accessories) to the following address:

Seitz Phototechnik AG
Environment & Recycling Department
Hauptstr. 14
8512 Lustdorf / Switzerland

swico *Recycling-Garantie*
Garantie de recyclage

This return shipment to the manufacturer is **free of charge**. The service is available **worldwide**.

Please contact us to arrange the return shipment and prepare the materials for the delivery. Your camera and accessories will be picked up by our courier service and will be recycled in our factory.

We wish you continued success and fun with your Roundshot VR Drive!

7. Technical Data

Roundshot VR Drive

Camera compatibility	any digital camera with shutter release cable or video camera
Lens brands	any
Focal length	from fisheye (8mm) to very long tele lens (> 1,000mm)
Min. time for image capture	example speed mode (1 row, 360°): 6 seconds
Exposure control	by camera and optionally by VR Drive (USB)
Image transfer	flash card on camera
Weight	2.7 kg (VR Drive x-motor, VR bracket, y-motor, motor connection cable, release cable)
Maximum weight on VR Drive	20 kg (44 lb)
Dimensions	VR Drive full: width: 230mm, height: 440mm, depth: 70mm
Power supply	Li-Ion batteries (rechargeable)
Battery autonomy	7 hours non-stop (speed mode), under normal operating conditions 1 week
Battery charger	110-220V universal charger - plugs provided for EU, North America, UK, Australia, Asia
Modes	quality, speed, turntable, timelapse, video, HDR
Language support	English, German, French, Italian, Spanish, Portuguese, Chinese, Japanese, Russian
Software features	camera information, camera, focal length, nodal points (A/B), angle mode (cylindrical, spherical, manual, visual), X angle, Y angle, overlap, camera orientation, rows (elevation/images), sequence, X speed, Y speed, release time, pause before/after, repetition, timer, acceleration, bracketing, manual release, mirror prerelease, direction of rotation, lens type (normal, fisheye), video points, HDR bracketing (medium exposure, bracketing steps, images, HDR table) general settings, camera database + favourites list, presets, etc.

Technical changes reserved

Impressum

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